

# AUTOMOTIVE INDUSTRIES

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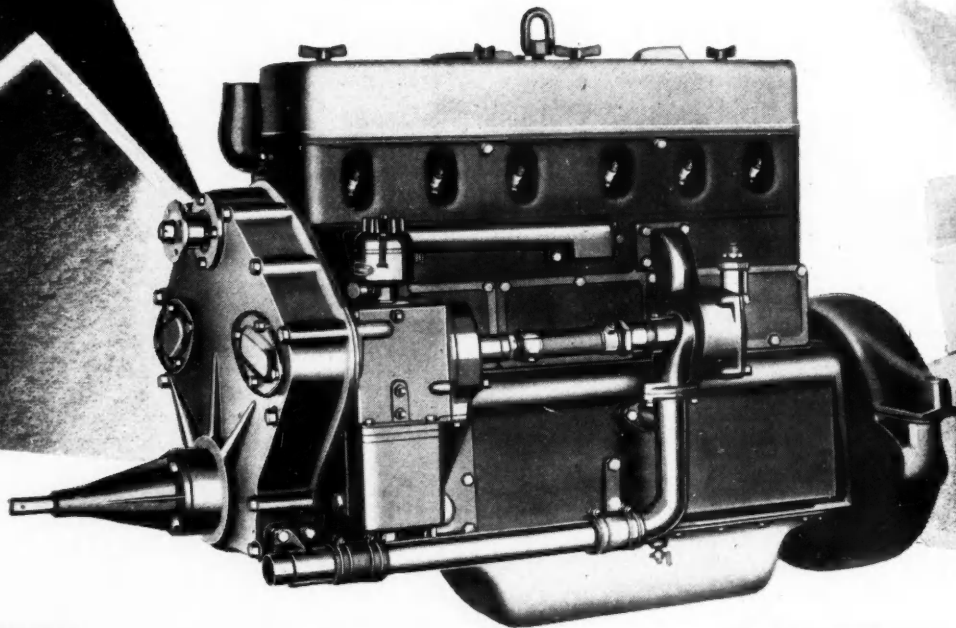
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## AUTOMOBILE

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Vol. 61

No. 18

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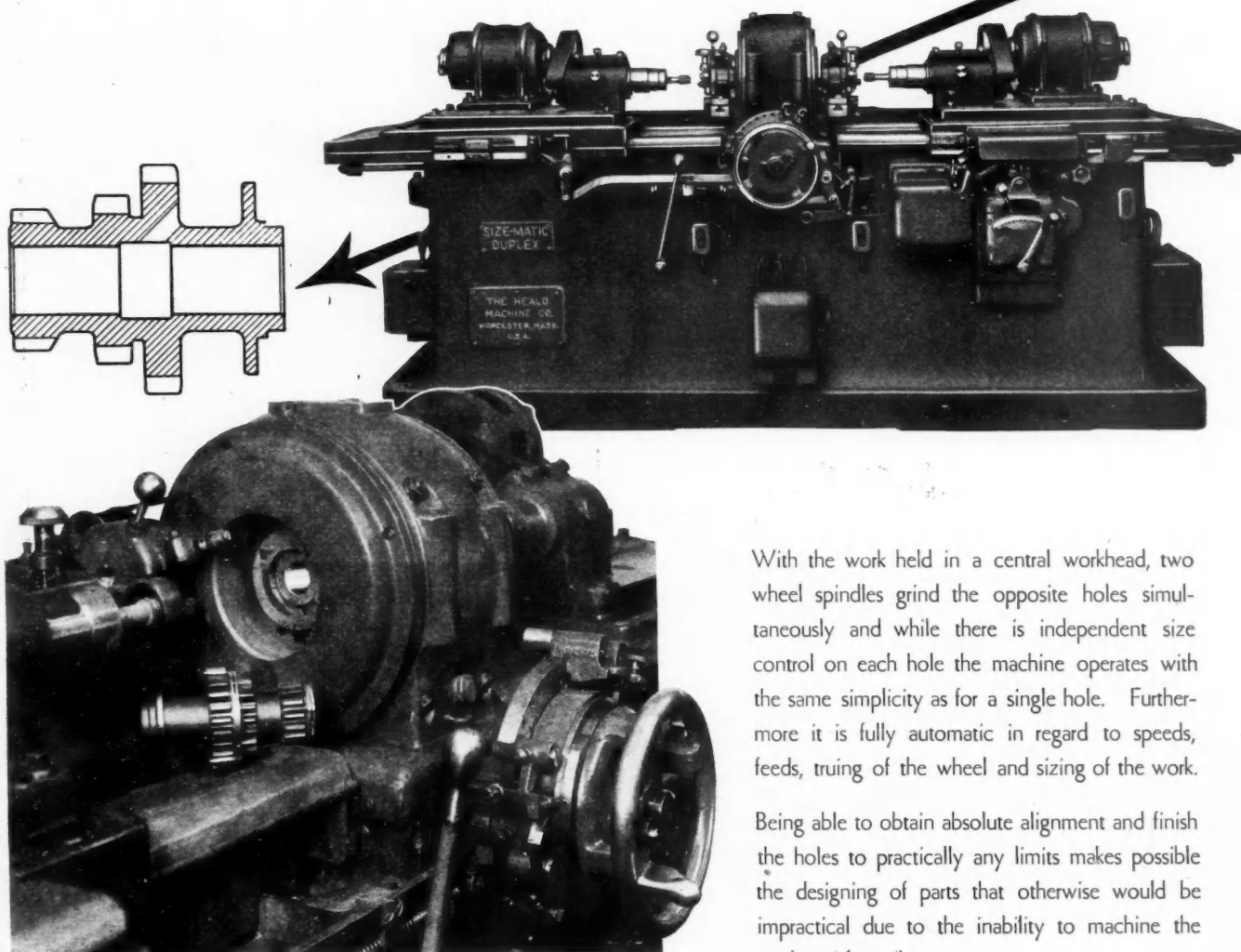
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# AUTOMOTIVE INDUSTRIES

VOLUME 61

Philadelphia, Saturday, November 2, 1929

NUMBER 18

## Trends in *Mechanical Design* Stress Power Increase

*More attention has been given the enlargement of cylinder bores.  
Engine speeds climbing more slowly, and the compression  
ratio appears to have reached its practical limits.*

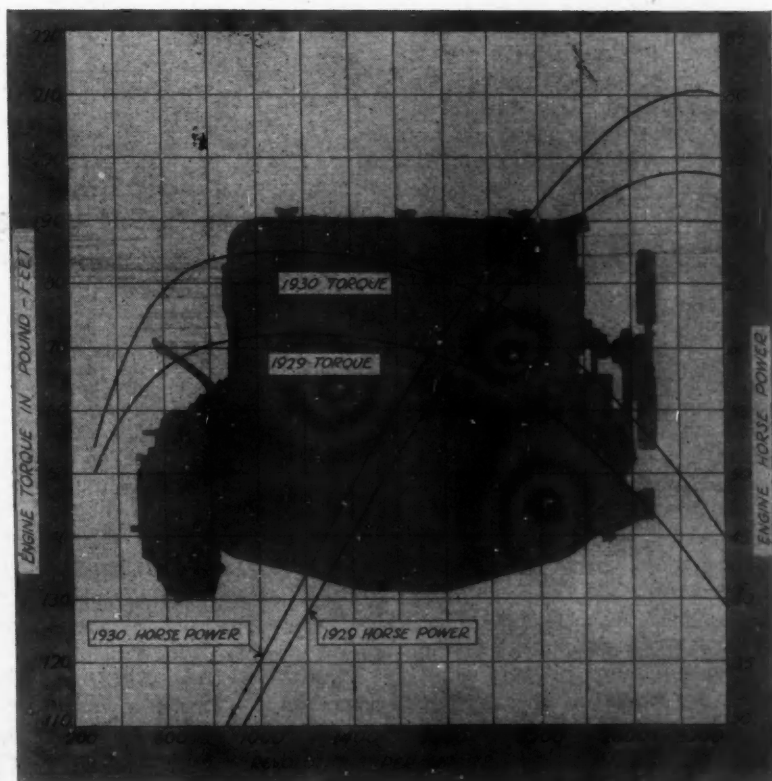
By P. M. HELDT

NOW that the Paris and London shows are over and the tendencies revealed by them have been reviewed in our columns, it seems apropos to analyze the trends in American car design as far as this can be done from the announcements which have been made to date. The season is slightly backward, for only 15 manufacturers have broadcast their 1930 programs since July first. In addition, however, several new models were brought out in the spring, and while they were not referred to as 1930 models, they will undoubtedly be continued during the coming year.

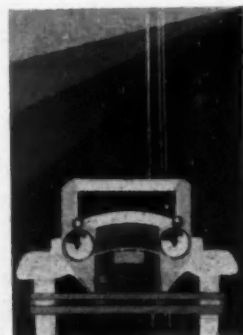
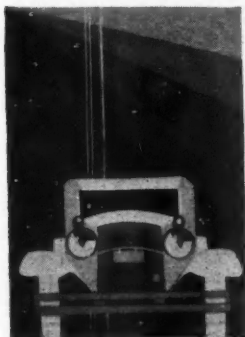
In the announcement of 1930 models that have appeared so far, no statement has occurred with such regularity as that the horsepower has been increased. This is by no means a new note, for horsepowers have been creeping up for a long time—in fact, ever since Elwood Haynes completed his first 1 hp. car. But the methods of increasing engine power have changed at times. The com-

pression ratio appears to have about reached its practical limit; engine speeds are still climbing, but more slowly, and mainly in that section of the industry which has been lagging in this particular development; hence the chief means of increasing horsepowers during the past year has been what Charles F. Kettering, general director, General Motors Research Laboratories, has referred to as the reamer method—the enlargement of bores. Among the makes of cars which have an increased bore this year are Nash, Buick, Elcar, Graham-Paige (all  $\frac{1}{8}$  in.), and Cadillac and LaSalle ( $\frac{1}{16}$  in.).

For the first time in many years, the piston displacement of a stock model has been reduced. Previous to last June, the Studebaker Dictator carried a six-cylinder engine of 242 cu. in. displacement, while since that time it



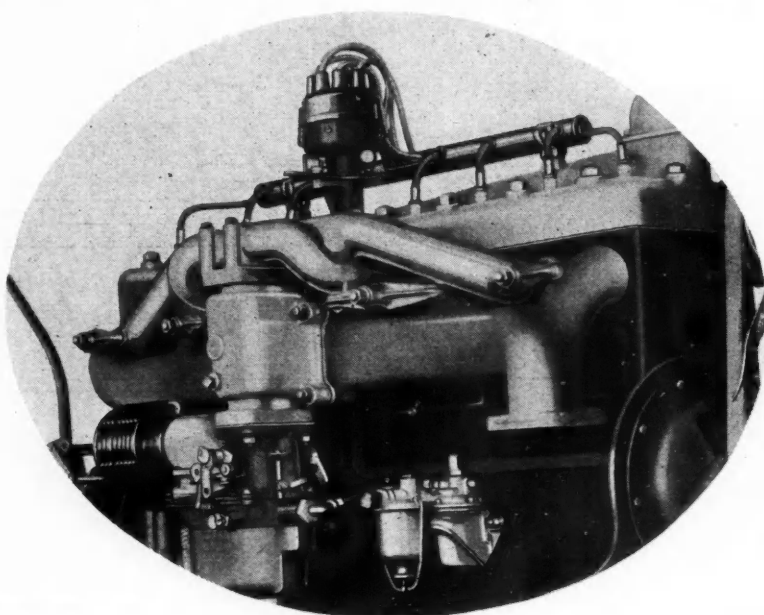
*The horsepower chart shown (Buick) is representative of the increase in engine powers during the past year*





*Balance weights on crankshafts (above) have made possible higher engine speeds (Hupp)*

*Downdraft inlet manifold (right). Note that the branches slope down toward the inlet ports (Marmon)*



has been equipped with either a six or an eight-cylinder engine of 221 cu. in. By using a higher rotary speed, the engine power has been maintained at nearly the same level. The object in changing to a smaller displacement in this case undoubtedly was to obtain a more rational gradation of displacements throughout the line.

As regards the number of cylinders, the trend toward the eight-cylinder type continues. Early last spring, the Olds Motor Works announced the Viking V Eight; Studebaker now furnishes the Dictator model either as a six or an eight, instead of as a six only; the two new front-drive cars which have appeared on the market in the course of the year both have eight-cylinder engines. Nash has adopted the eight for its largest model. An additional eight in the higher-priced class has been announced by Marmon, and another prominent maker is expected to announce his first eight before long. As an exception confirming the general rule, we have the case of Gardner, which after confining itself to straight-eights for some time, has added a line of six-cylinder cars. The first twin-eight has been heralded by Cadillac.

#### Intermediate Models

Two makers in the course of the year brought out new models which are intermediate in size between continued models, combining the parts and the equipment of these older models in such a way as to produce a vehicle that is intermediate between them in value. This plan of developing additional models, largely from existing parts, is not new in large organizations, and it seems to be meeting with increased favor.

Features of engine design which go with high-speed operation, such as aluminum pistons, duralumin connecting rods, balanced crankshafts and main bearings between all adjacent crank throws, are coming into wider use. Nash is an addition to the still comparatively small number of users of light alloy connecting rods, while Reo has introduced a new aluminum alloy for pistons developed by the Aluminum Co. of America. On a new Hupp model, in order to reduce the reciprocating

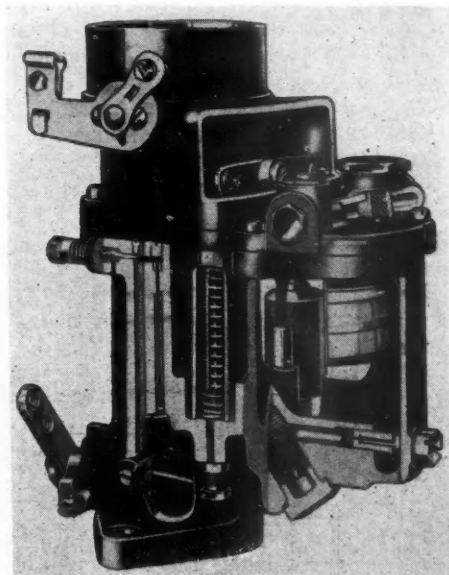
weight, the bushing at the upper end of the connecting rod is made of two pieces of rolled strip bronze, and of the big end bearing only the half in the rod is babbitted, the crankpin bearing directly on the cap.

The dual inlet manifold, which was introduced for eight-cylinder vertical engines last year, is now being used on practically all engines of this type, and another feature in inlet manifolding—the downdraft construction

—is also gaining adherents. With this type of manifold, the flow beyond the riser is downward, which tends to make any unvaporized fuel flow into the cylinders, instead of back into the carburetor.

With the adoption by Packard of a carburetor manufactured by the Detroit Lubricator Co., the last of the car manufacturers has discontinued manufacturing its carburetor itself. Chrysler has introduced the downdraft carburetor, in which the air enters

*Downdraft carburetor (Chrysler) is shown at the right. Air enters at the top and combustible mixture leaves at the bottom*



at the top and the mixture leaves at the bottom and follows a downward course from there on. The advantage of this construction is that the force of the air current is not entirely depended upon to carry the fuel along once it has left the spray nozzle. Hence, satisfactory distribution may be obtained with a lower minimum air speed. This means that it is not necessary to make the inlet pipe of small section in order to insure satisfactory idling, and with a larger inlet pipe a greater maximum output is obtainable from the engine.

Pump feed from the main fuel tank to the carburetor has continued to find new applications. Control of the heat supply to the inlet manifold also is becoming more common. On the Cadillac and LaSalle this feature is automatic. When the air flows through the carburetor



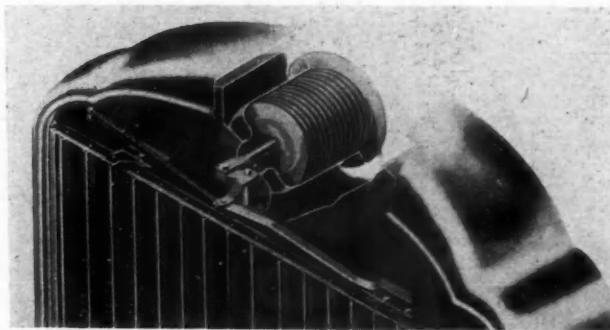
at a rapid rate, there is not much need for extraneous heat, as the fuel is then finely sprayed, and the fine fuel particles are easily turned into a gas. But when the air flow is slow and the fuel leaves the nozzle in comparatively large globules, additional heat must be supplied to vaporize these in the short time available. In the Cadillac, a weighted butterfly valve is placed in the exhaust line to the inlet jacket. The valve shaft and its bushings are made of stainless steel so that the valve always will turn freely. At the higher engine speeds, the valve is held closed by gravity, but when the car runs at less than 25 m.p.h. the reduction in the manifold vacuum opens it.

A continued trend toward the use of metric-size spark plugs may be noted. Chrysler uses, in connection with six-cylinder engines, double three-lobed interrupters, so that each of the interrupters is required to produce only half of the total number of sparks needed. By this means, some of the difficulties connected with the ignition of high-speed engines are overcome. Where it has been customary to set the spark at about dead center when in the retarded position, to prevent back-kicks when starting, in the new Cadillac and LaSalle it is set at 18 deg. advance.

#### Cooling System Refinements

Pump shafts have been a source of considerable trouble for years past, and most of the makers of cars in the higher-priced range now use either a rust-proof coating or a non-rusting material for this shaft. Chrysler is using chromium plating while Packard has adopted the use of stainless steel for the shaft. The difficulty of making the radiator fan really effective with the present trend toward higher and narrower radiators was referred to in these columns some time ago. Not only is it impossible to blanket a radiator of highly elongated form by the sweep of a fan, but if the fan and pump are built as a unit and the pump is located in the cylinder block, it is often impossible to have the fan sweep over that portion of the radiator where it can do most good. For this reason Hupp, although adhering to the unit construction of fan and pump, now mounts the pump outside the cylinder block.

Radiator shutters operated automatically by means of a thermostat are becoming a common feature, replacing the thermostatically-controlled circulation valve.



*Thermostatic control of radiator shutters (Buick)*

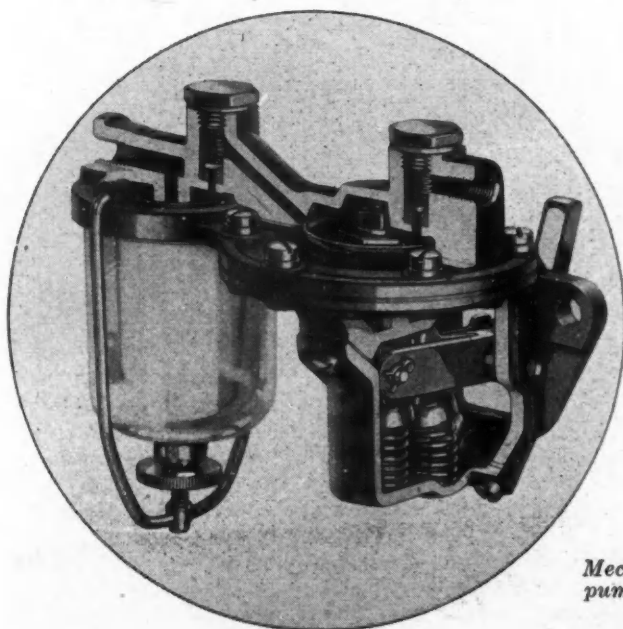
Up to now, pressure lubrication of engine bearings has extended only to the crankpin bearings, as a rule, and the piston pin bearings have had to depend on the oil spray in the crankcase. Now there seems to be a tendency to extend the pressure system to the piston pin, the most highly loaded of all engine bearings. In the new Nashes, as well as in the Hupmobile, this lubrication feature is found.

There is a tendency to remove the starter button from the toe-board to the instrument board or dash. There are probably few cars now running in which the starter button, if on the toe-board, is not in a rather inaccessible position. The original object in placing it there, some distance to the right of the accelerator pedal, probably was to make the necessary length of the starter cable as small as possible. Shorter starter cables reduce the voltage drop due to the flow of starter current through these cables, and therefore make the starter more powerful. Another objection to the usual location of the starter button, closely adjacent to the accelerator pedal, is that it is easily depressed accidentally by the foot slipping off the accelerator pedal. Several makers have adopted double-reduction starter gears, which probably was found advantageous in view of larger cylinder bores.

A good many years ago it was discovered that leakage of lubricant from the transmission case is promoted by the accumulation of pressure in the case due to the generation of heat therein, and since then breathers on the transmission housing have become quite common. Now Cadillac engineers have discovered that the clutch acts as a centrifugal air pump and produces a partial vacuum at the center of the housing, which tends to draw lubricant from the transmission housing into the clutch housing—where it is not wanted. Ventilation of the clutch housing has proved a remedy for this trouble.

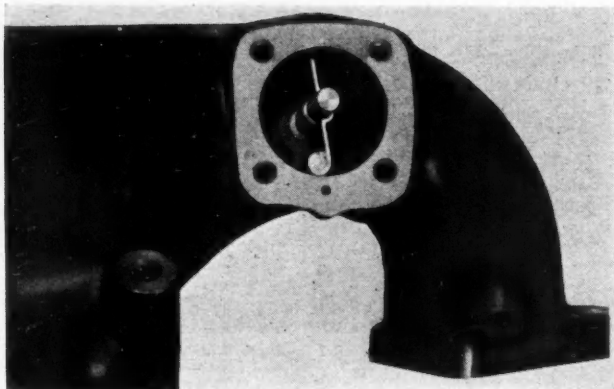
#### Four-Speed Transmissions

Probably the most pronounced tendency revealed by the announcement of 1929 models is that toward the adoption of four-speed gearsets with noiseless third speeds (and three-speed gears with noiseless second). The original transmission of this character depended for the silence of its "next-to-top" speed on the use of internal gears, and while this remains the predominating type, two others have now come into use. In one of these, herringbone gears are used for the silent geared speed. Herringbone gears are naturally silent in action, if properly made, but they do not lend themselves to being meshed by lateral shifting. This difficulty is overcome by keeping the pinion and gear in mesh continuously and engaging the set by means of a positive clutch of the same type as is used for the direct drive. While herringbone gears are inherently quiet, in this case any tendency toward noisy operation is



*Mechanical fuel pump and filter (Nash)*





*Automatic heat control unit, the operation of which depends upon engine load*

further guarded against by cutting the two halves of the gears with teeth of different pitches. A transmission of this type is being used on the Reo car.

The Packard Motor Car Co. is using a four-speed transmission of the ordinary spur gear type. That such transmissions can be made quiet in action we know from European practice. American transmissions of this type in the past have been rather noisy, as a rule. With the large engine torque in proportion to car weight available on the average American car, it is necessary to use the gears only in starting and under exceptional traffic conditions. When the engine is throttled down, as in congested traffic, even an ordinary gear is sufficiently silent, and American makers in the past appear to have considered it economically unwarranted to go to the very considerable expense of making the transmission silent when they are used only momentarily during acceleration.

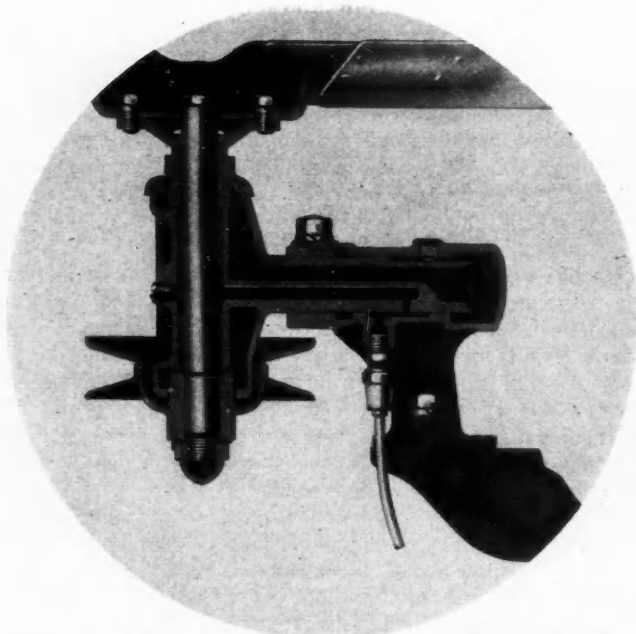
The problem of silent transmissions has really two aspects. By means of the use of internal or helical gears, etc., it is possible to make the highest geared speed comparatively quiet, which is a desirable object in itself. But immediately the highest geared speed becomes

silent, there is not the same objection to using it for regular driving that there has been, and the need for so gearing the rear axle that almost everything can be taken on high, disappears. Using a large rear axle reduction is advantageous from the standpoint of ease of control, but it is hard on the engine, in that it makes it necessary for the engine to operate at comparatively high speeds for a certain car speed, and it also reduces fuel economy, as the engine is the more efficient the greater the torque load upon it, and the engine torque load is less the greater the rear axle reduction.

It is quite likely that during the coming year the future of the four-speed transmission with silent third in American passenger car practice will be definitely decided. Up to recently, only a small number of cars were equipped with such transmissions, and many buyers may have been unable to find among them cars that met their requirements in other respects. Now, however, there is a great variety of cars with such transmissions to choose from.

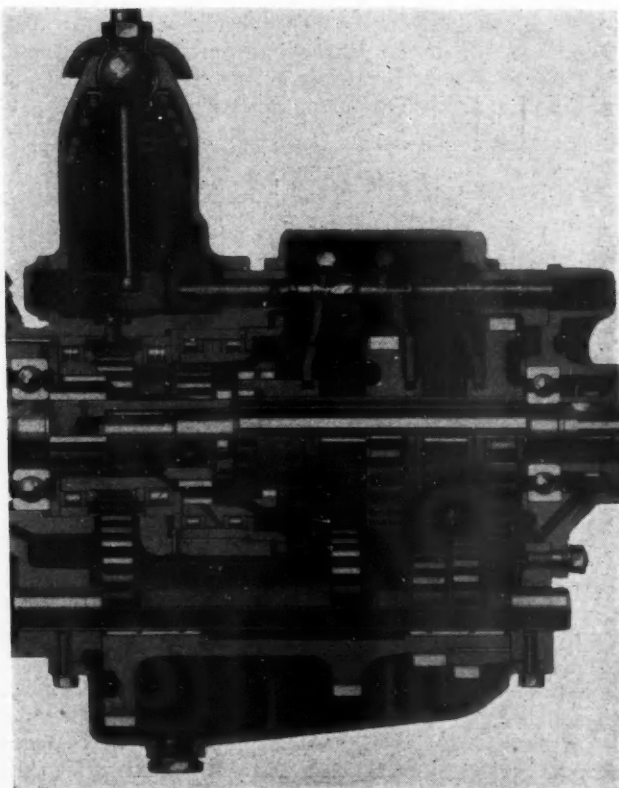
#### Clearing the Driver's Compartment

More gearshift levers have been moved to the clutch housing cover with the object of eliminating obstructions from the driver's compartment. This is one of the creditable points on the balance sheet of the front-wheel drive. With such a drive, the transmission is located far forward of the dashboard, and gears are shifted by means of a horizontal rod extending through an opening in the dashboard and carrying a vertical handle at its rear end. With a brake lever at the driver's left, this leaves the forward compartment quite unobstructed. There are certain indications—I need mention only the experiments made by the Timken Roller Bearing Co. on rear axle bearing deflection and the recent article in these pages by Ludlow Clayden—that as a result of the constant increase in engine power and car speeds, the factor of safety in rear axles has become inadequate in many instances. The rear axle of the Packard has been redesigned for more rigid bear-



*Above is shown a method of pressure lubrication for fan bearings (Cadillac)*

*To the right is a section of one of the new four-speed transmissions with silent third (Chrysler)*



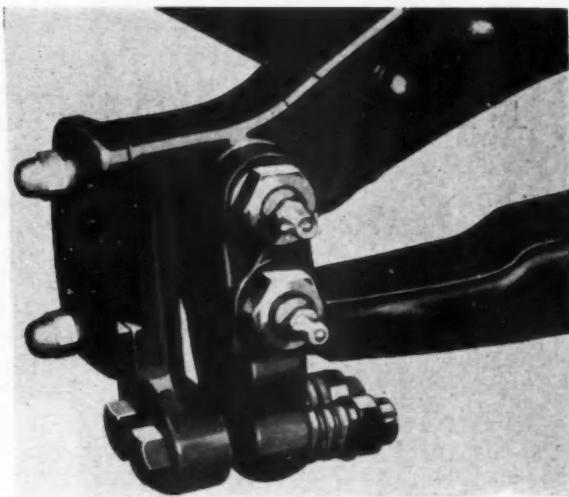
ing support, and we may hear of others taking similar steps.

In connection with springs also, there has been considerable activity. Buick has given up the cantilever rear springs which have distinguished its product for so many years, and by a singular coincidence the foremost European champion of the cantilever, Rolls-Royce, took the same step at practically the same time. The reasons for discarding the cantilever spring were not stated by either of the firms concerned, but presumably the great concentration of load on the frame side rails at one point and the difficulty of preventing side sway with these springs had something to do with it.

#### "Wheel Fight" Dampers

More cars have appeared on the market in which the front springs are shackled at both ends, one of the two shackles being restrained by coiled springs in its motion around its pivot connection to the frame. It appears to make little difference whether the spring-restrained shackle is at the front or the rear. The chief object of this construction seems to be to minimize wheel fight. Studebaker and Buick, two of the recent converts to this type of front suspension, place the cushioned shackle at the forward end, while Nash, who also adopted it recently, places it at the rear end.

Two of the new lines recently announced, the Nash and the Packard, have all chassis springs inclosed in sheet metal casings filled



*The steering modulator (above) is designed to prevent "wheel fight" (Cadillac)*



*The three-spoke steering wheel (left) marks a new tendency (Hupp)*

other for emergency braking. To reduce scoring of the steel brake drums, a section of the lining near the leading edge is replaced with lead, which is supposed to act as a lubricant. The cable type of brake adjusting mechanism featured on Cadillac and LaSalle last year has been discontinued, but steel cables as a means of brake connection have scored a further gain in being adopted on the Nash.

In steering gears, the increased use of roller bearings is featured, as a means of reducing the physical effort required to operate them. Many of the new cars, including the Chrysler, Graham-Paige, Hupp and Nash, have three-spoke steering wheels which offer less obstruction to the driver's view of the instrument board.

Central chassis lubrication has not made much progress during the past year, and from the reports of the Paris and London shows it would almost seem that Europe was adopting this feature more rapidly than we are. Nash on one model has adopted the Alemite automatic system.

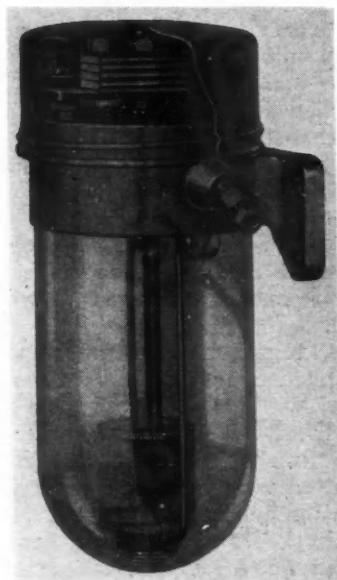
#### Front Drives

Another distinct development of the past year is the launching of two makes of front-driven cars on the American market, the Cord and the Ruxton. It is possible to name a considerable list of European cars of the front-driven type, but practically all of these either have never passed the experimental stage or have been produced in small series only. The production figures recently given out for the Cord leave no doubt that the United States now leads in the production of this type of car. Several other manufacturers are reported to be working on front-drive models, and as the design of such cars involve certain problems which permit of a number of different solutions, we may expect to see considerable engineering effort spent on them.

*The chassis lubrication pump and reservoir (left) is a refinement of note (Nash)*

with lubricant, which are claimed to obviate the need for attention to interleaf lubrication for the life of the car.

Frames are still being stiffened by the use of deeper sections and of lips on the free sides of the flanges, as well as by the more extensive use of tubular



cross-members. On the new Nash, no less than six such cross-members are used.

Refinement in brake design continues. There is a tendency toward limitation of brake equipment to the four-wheel brakes, of which the rear pair can be actuated by the hand lever as well as by the pedal. The latest Buick is equipped with the Huck type of brake which has been fitted to the Cadillac and LaSalle for some time past. In each rear drum there are two pairs of shoes, of which one pair serves for service and the

# Marmon Announces *Big Eight* Line

*New series gives coverage in four price groups and marks reentry of the company into the manufacture of higher priced cars incorporating many familiar features.*

**R**EENTRY of Marmon into the higher-priced car field is signalized by the introduction of the Big Eight, a car to sell in the \$3,000 range. This addition to its line gives the Marmon Motor Car Co. coverage in the eight-cylinder field in four price brackets, extending upward from about \$1,000, \$1,500, \$2,000 and \$3,000, respectively.

Built on a 136-in. wheelbase, the new car has an overall length of 202 in. It has a tread of 58 in. in front and 59 in. in the rear. It is powered by a straight eight, L-head engine of Marmon design and manufacture, developing 125 hp. at 3400 r.p.m. Bore and stroke are  $3\frac{1}{4}$  by  $4\frac{3}{4}$  in., giving a total piston displacement of 315.2 cu. in.

## Warner Transmission

Among points of interest in the new series are the use of a Warner four-speed transmission, cable-actuated Bendix duo-servo four-wheel internal brakes, the new Ross roller-mounted cam-and-lever steering assembly, and a monocoil outward-swinging windshield.

Massiveness in appearance has been combined with low and trim lines, and although the new cars in certain points are reminiscent of the familiar Marmon contour, the sweeping body lines and long windows mark something of an advance. Windows are slightly curved at the top, with curved reveal treatment at the bottom. Doors also are slightly curved at the bottom. Four ventilators on each side of the

hood, operated by chromium-plated knobs, replace louvers. Front fenders are in one piece.

Body design features include a slope at the rear of the roof, which ends sharply in a symmetrical line. Reveals surrounding the rear windows are used to achieve desired color harmonies. The usual exterior sun visor is replaced by two interior adjustable visors, and the Marmon "spear-point" is worked into the design of the radiator shell, headlamp shells and parking lamps. The hood hinge is chromium-plated, the band of chromium widening symmetrically from the radiator to the windshield, where it attains a width of 6 in.

In a detailed description of the engine the new double-domed combustion chamber should get first mention. As will be seen from the sectional view, the design allows of almost complete water-jacketing not only of the cylinder barrels, but also of the valve-stem guides, spark-plug bosses, and intake and exhaust passages. All high-tension cables are enclosed

in conduits over their whole lengths. The compression ratio of 5.5 to 1 is said to make it possible to operate on "straight-run" as well as on doped fuel.

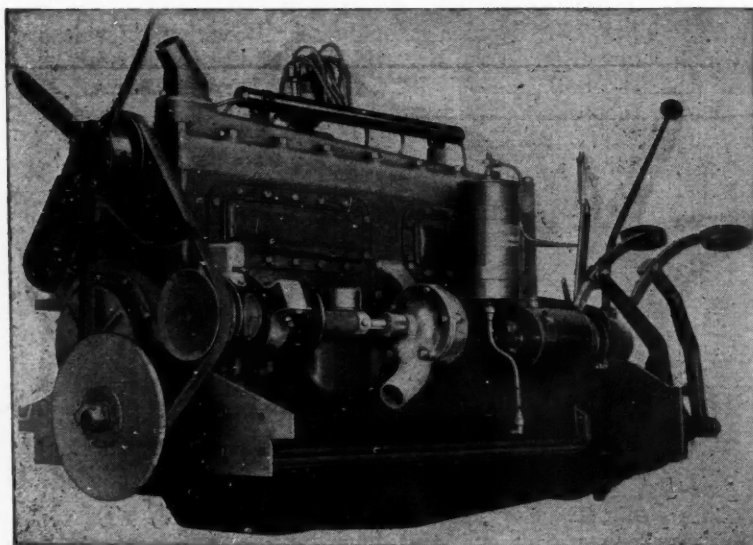
All cylinders, together with the upper part of the crankcase, are in a single casting of semi-steel, while the lower section of the crankcase is of pressed steel. Cylinder bores are finished by honing. The crankshaft is fitted with the Marmon high-frequency vibration damper, and is mounted in five bronze-backed, babbitt-lined bearings, the central one of which takes the thrust.

## Bearing Tolerances

Main bearings have a diameter of  $2\frac{5}{8}$  in. and are of the following lengths (front to rear):  $1\frac{27}{32}$  in.,  $2\frac{1}{8}$  in.,  $1\frac{3}{16}$  in.,  $2\frac{3}{32}$  in. and  $1\frac{27}{32}$  in. These bearings are fitted with a clearance of 0.0025 in. and the end play of the crankshaft is held between 0.002 and 0.006 in. The camshaft is driven by a Diamond nonadjustable double roller chain having a length of  $24\frac{3}{4}$  in.



*The rubber-insulated clutch disk is shown in section. Live rubber insulation is inserted between the clutch hub and disk*



*The left side of the 125-hp. straight eight used in the new Marmon, showing the oil filter and water pump. Note large size of oil filler*



# With Four-Speed Transmission

By M. WARREN BAKER

Inlet as well as exhaust valves are of Wilcox-Rich make, the former being of No. 3140 steel and the latter of Silchrome. The inlet-valve head diameter is 1.687 in. and the exhaust valve head diameter, 1.562 in., and both valves have 30 deg. seats. Both sets of valves have stems with single-grooved ends, and the valve guides are removable. The operating clearance of the valves is 0.007 in. and the springs of both sets have a pressure of 55 lb. when the valves are closed and 100 lb. when they are open.

## Permite Pistons

Permite split-skirt pistons are used, 3 13/16 in. in length, fitted with three compression rings and one oil ring, all above the pin. The lower oil groove is drilled radially. Piston pins are 2 13/16 in. long, with diameters of 7/8 in. They are full-floating and are held in the bushings by retaining rings.

Connecting rods are 9 1/2 in. long between centers and are I-section steel forgings which have the babbit poured directly into the lower bearings. These bearings are fitted with clearances of 0.0015-0.00175 in., and no shims are used.

Positive lubrication by means of a gear-type pump is supplied to main, connecting rod and camshaft bearings, at a normal pressure of 40 lb. per sq. in. at 40 m.p.h.

Ten quarts of oil are required to fill the engine when empty, and a spear-type of oil level gage is provided to determine the level of oil in the sump. An AC oil filter is standard equipment.

The fuel system includes a Schebler 1 1/4-in. dual carburetor, supplied with fuel by an AC diaphragm pump.

The manifold also is of the dual as well as

of the down-draft type, and is exhaust-heated, with adjustment of the heat from the instrument board. An AC air cleaner is supplied.

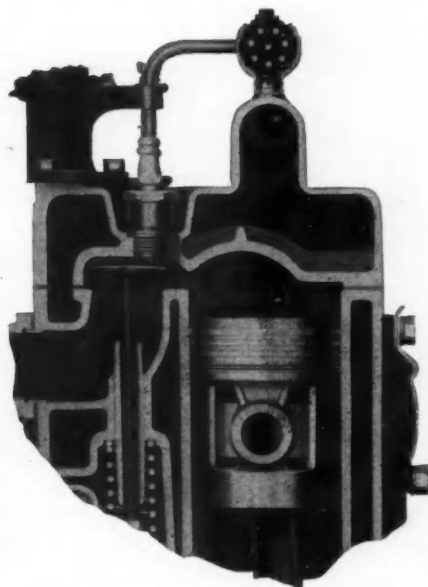
A centrifugal pump, driven through the generator shaft, circulates the water through the

cooling system, which latter has a capacity of 7 gal. The radiator fan in the new eight series is of the oil reservoir-type.

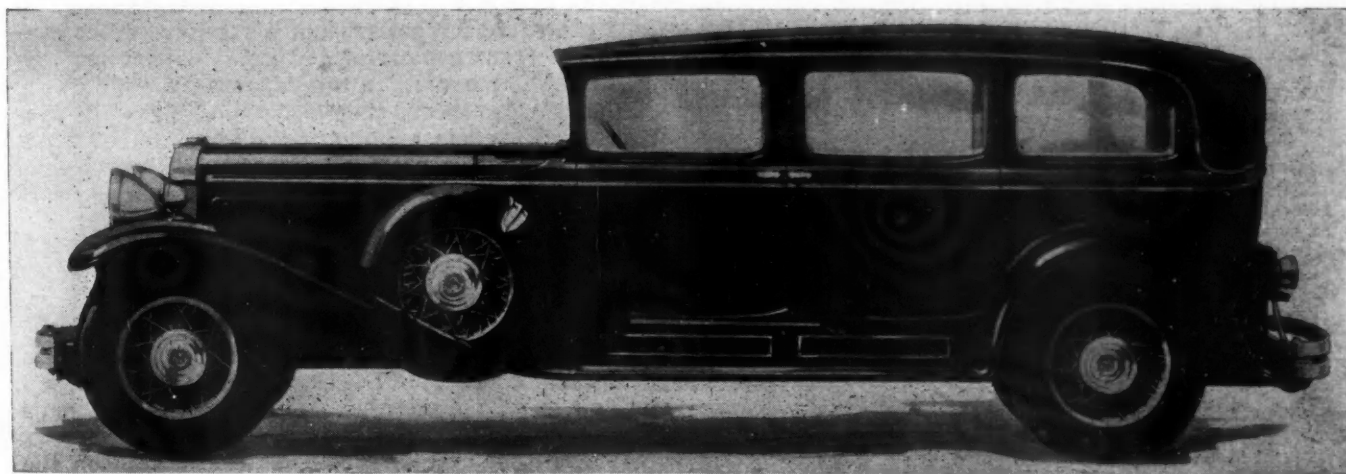
## Delco-Remy Electric System

The electrical system is a Delco-Remy. Metric-threaded spark plugs are used, with standard length shells. The starting motor has a normal engine cranking speed of 125 r.p.m. Bendix inertia engagement is used. A rubber-insulated hub features the Rockford clutch, which is of the single-plate, dry type. The Warner transmission has the following gear ratios: Fourth, 1 to 1; third, 1.475 to 1; second, 2.46 to 1; first, 4.01 to 1; reverse, 3.46 to 1.

Salisbury rear axles are used, having a standard final reduction of 4.45 to 1, but on the seven-passenger sedan and the limousine the rear axle reduction is 4.81 to 1. The propeller shaft is of seamless steel, 3 in. in diameter. Tires are 31 by 6.50 and Bimel wood



Sectional view of the Marmon's double-dome cylinder head



The new Marmon Big Eight seven-passenger sedan

wheels are standard while Dayton wire wheels are optional.

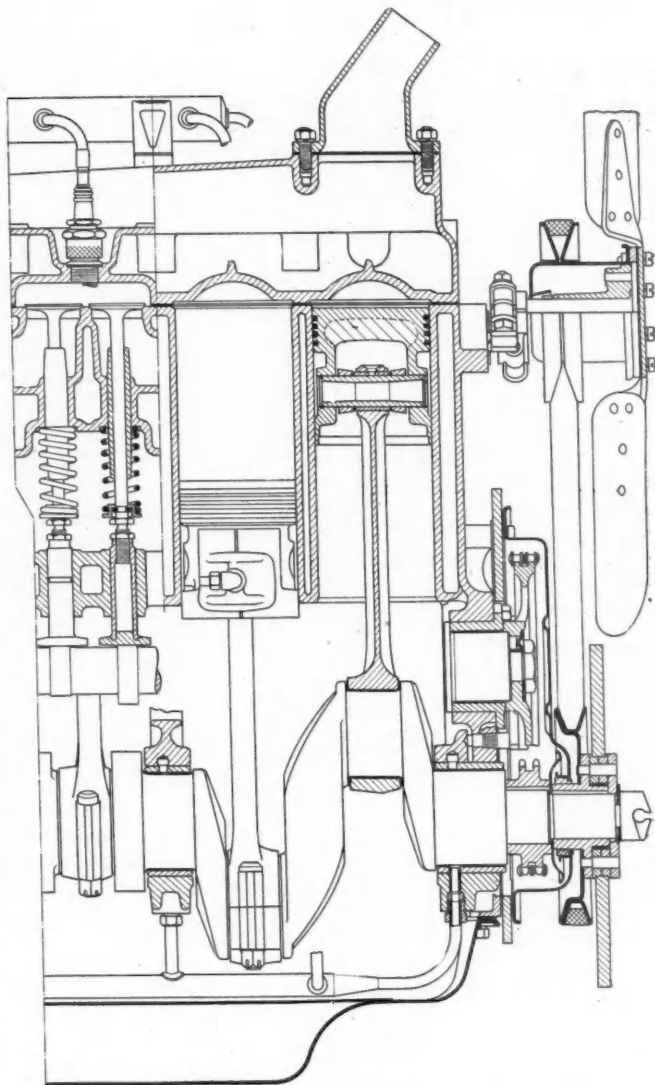
Harvey silico-manganese springs of the semi-elliptic type are fitted all around. Front springs are 54 by 2¼ in.; rear springs, 60 by 2½ in. Springs are mounted in rubber shock insulators of the new chimney type. Two-way hydraulic shock absorbers are mounted front and rear. The front axle also is of Salisbury make, with reverse Elliott ends. All wheel brakes are 15 in. in diameter and take 33 in. of lining each. The brake lever operates the same four-wheel brakes which are used for service braking. The frame of the new job has side channels of 5/32-in. stock, 7½ in. deep at the middle and with a 2¾-in. flange at the top and a 3-in. flange at the bottom.

#### Interior Appointments

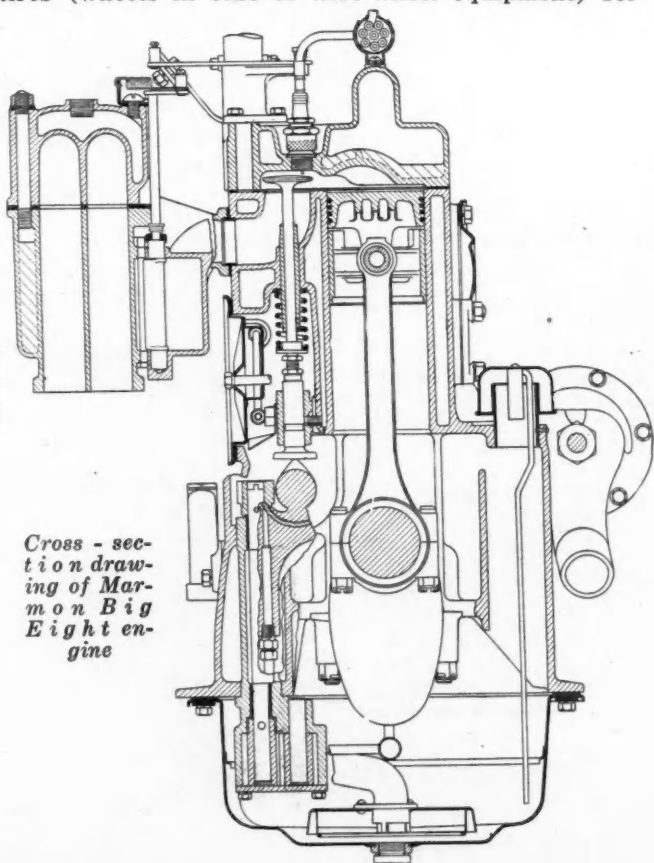
Interior appointments and fittings are on a par with the outside appearance. Roominess is one of the features stressed, and notwithstanding the low appearance of the cars, the head room provided is approximately 37½ in. In the seven-passenger sedan the rear seat cushions are 55 in. wide while the front seat cushion is 41½ in. and the front seat back 45 in. wide.

Six body styles constitute the initial offering in this series, including a five-passenger sedan, seven-passenger sedan, two-passenger coupe, seven-passenger limousine, four-door brougham and four-door club sedan. All models are fully equipped with non-shatterable glass.

With the exception of the club sedan and the brougham, all models carry trunk racks. The brougham has a fabric back. The club sedan and the brougham, however, carry trunks on an integral platform as standard equipment. The trunk on the brougham is covered with a fabric material matching the rear quarters, the same material being used for the tire covers. All Big Eight models carry the spare tires (wheels in case of wire-wheel equipment) for-



*Partial longitudinal section of the Marmon Big Eight engine*



*Cross-section drawing of Marmon Big Eight engine*

ward and have a specially designed tire or wheel support extending through the body.

The front compartment of the limousine is upholstered in black leather and the full width glass partition may be fully lowered into the back of the front seat. Auxiliary seats in both seven-passenger models extend the full width of the tonneau when opened. The telephone in the limousine has a transmitter in the right rear-door pocket, and a receiver in the center of the front compartment roof. A rear compartment clock is mounted on the upper headboard.

A panel section running board side shield is provided on all models, enhancing the appearance. Rubber kick pads are provided, surrounded by chrome-plated molding. All exterior bright work is chrome-plated, while the door handles are of the new theft-proof type, which when locked, cannot be twisted off, but merely become loosened when pressure is applied and turn freely without opening the door.

Instrument panels are placed unusually far forward and the instruments themselves are enclosed in a panel with nickel base. The cluster includes a speedometer, oil gage, ammeter, electric clock, gasoline gage and heat indicator.

Starter, light and horn controls are located on the steering wheel, while throttle, spark, inlet-heat and choke controls are mounted on the instrument board.

# Stutz Offers Supercharger on Stock Model

*Equipped with Roots type blowers, 25 cars will be sold to selected buyers.*

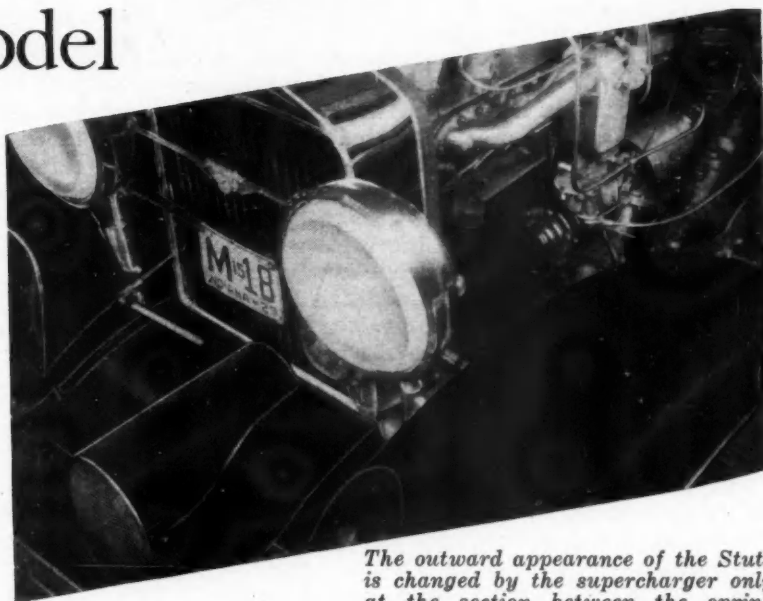
**A**FTER several years of research, the Stutz Motor Car Company of America, Inc., is placing upon the market a preliminary offering of 25 automobiles equipped with a supercharging system of an advanced and "fool-proof" type.

These cars, which will start off the ends of the assembly lines early in November, will be sold only to selected prospective purchasers who understand the mechanism.

Cars equipped with this system present only one change in outward appearance. The apron between spring horns is flared upward in a curve to match the general body line, the blower installed and screened, projecting to within a few inches of the front bumper.

One of the features of the system is its freedom from fire and explosion hazards. Another lies in the fact that it operates at engine speed, requiring no excessive gearing and therefore no great strain on shafts and bearings as is usually the case in race car installations.

The system includes a blower of the Roots type, with two figure 8 blades, 6.369 in. long, one of which is keyed to the clutch shaft while the other floats on an auxiliary shaft. Both the clutch shaft and the auxiliary shaft are mounted on ball bearings and operate in a continuous bath of oil. The clutch is bronze faced, and



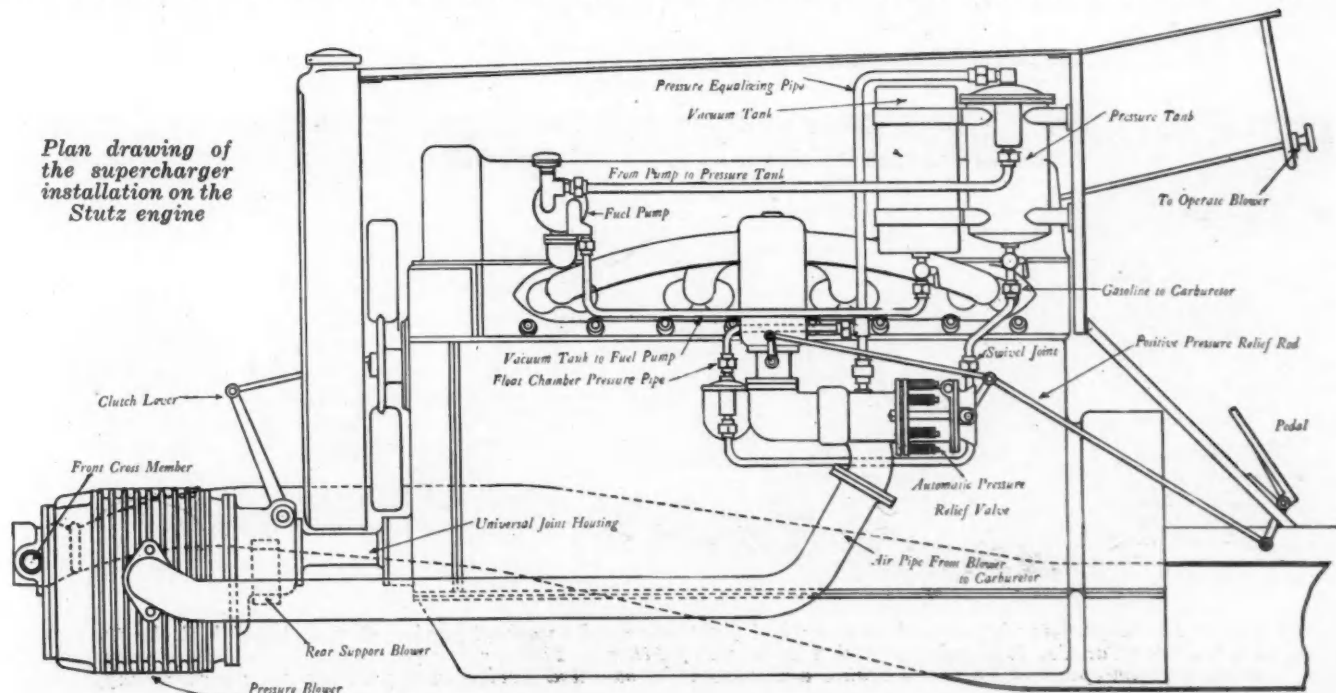
*The outward appearance of the Stutz is changed by the supercharger only at the section between the spring horns, where the blower screen projects to within a few inches of the bumper*

likewise operates in a continuous bath of oil. It consists of two disks having a maximum outside diameter of  $4\frac{5}{8}$  in. The total clutch throw is  $\frac{3}{4}$  in.

A pull knob on the instrument panel is connected to the clutch throwout lever by a rod which runs through the radiator shell to the supercharger housing. Because of the bronze clutch facings and the great pressure exerted by the three clutch tension springs, it is possible to throw the clutch in or out at any engine speed without damage either to the clutch or the blower mechanism.

An air pressure pipe about 3 in. in diameter connects the blower to the carburetor air intake. The air intake

*Plan drawing of the supercharger installation on the Stutz engine*





horn of the carburetor is replaced in this installation by a cage or flange valve, consisting of two flanges held together on studs, springs being interposed on the studs between the retaining pins and the loose flanges.

#### Six Valve Springs

Six springs are being used on the present installation, giving a pressure relief factor of 4 lb. plus or minus 2 oz. It is possible, however, to vary the number of springs and thus change the relief pressures. The springs are made of light spring wire,  $\frac{1}{2}$  in. in diameter and 6 in. long. They are compressed about  $\frac{1}{3}$  of their free length when the valve is closed. Since the valve opens to a maximum of only  $\frac{5}{16}$  in., it will be seen that the difference in tension when the valve is opened and closed is so slight that the valve will open freely as soon as the predetermined pressure is reached, and will not permit the forming of additional pressure.

A freely balanced flap check valve, fitted in the end of the free flange, closes when the pressure mounts in the cage and, when the carburetor is operating under normal atmospheric pressure, opens to allow normal ingress of air. This valve is so pivoted that when the engine is not running it hangs partially open.

An auxiliary pressure tank is located directly behind the vacuum tank on the dash and is connected to the vacuum tank through an auxiliary fuel pump mounted near the forward end of the camshaft and driven off it. The top of the pressure chamber is connected by a pipe with the air pressure chamber in the cage valve, thus keeping the pressures equalized at all times.

The pressure tank has a float mechanism which shuts off the incoming fuel when it reaches a predetermined level. Due to the construction of the Biflex pump, no further fuel can be forced past the float valve until the fuel level falls.

The principle of operation is as follows:

Fuel is drawn from the main supply tank at the rear to the vacuum tank by the same Oil-Vac system as is used in standard Stutz models. Since the auxiliary fuel pump driven off the camshaft is on the same level as the outlet of the vacuum tank, the pump is not required

to lift the fuel, but forces it into the pressure tank.

When the blower is cut in, the pressure of the air in the cage valve shuts the swinging flap valve. This same pressure is placed on the fuel in the pressure tank, forcing it downward into the carburetor at the same pressure as the inrushing air. The air pressure chamber also is connected by a pipe to the carburetor float chamber, thus placing the system in perfect balance.

Should the accelerator be released suddenly, the pressure will mount in the air chamber until it forces open the flange valve and is relieved. This occurs instantaneously in deceleration, since the valve springs are closely calibrated and require only a slight increase in pressure to force the valve open.

Should the blower be cut off while the engine is running at high speed, the following takes place:

Pressure immediately drops below atmospheric in the air chamber, thus causing the swinging air valve to be forced inward. Atmospheric pressure then prevails in the air cage, the float valve chamber, and above the liquid in the fuel pressure tank, placing the entire system once more in perfect balance.

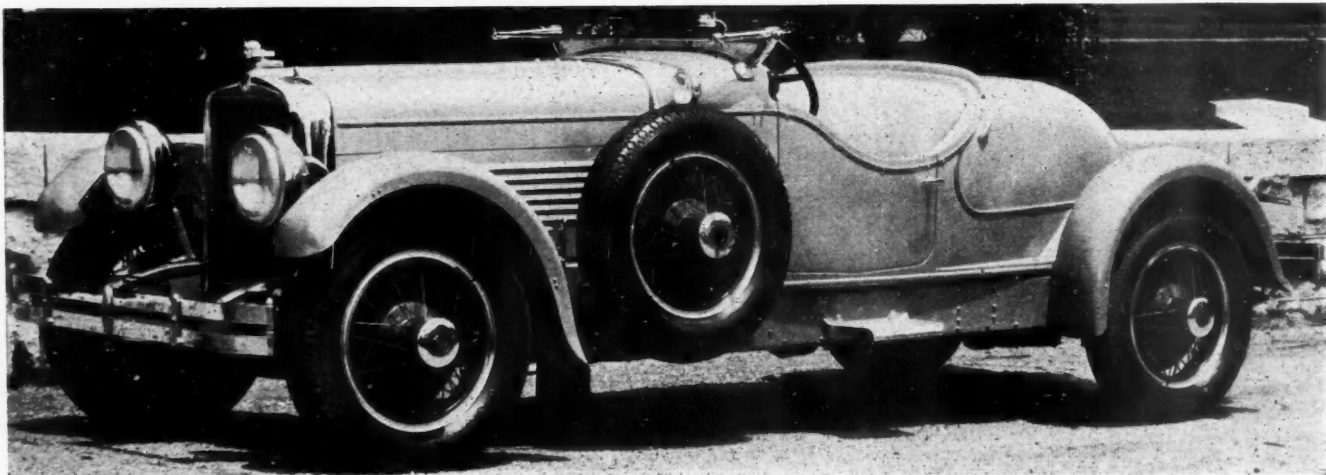
#### In Case of Failure

If for any reason the system should fail, it may be cut out entirely by switching the pipe leading from the pressure tank to the carburetor, over to the vacuum tank outlet fitting. This cuts the pressure tank entirely out of the system and permits the engine to be operated with the standard fuel feed. The carburetor feed pipe has a swivel joint to make this change possible.

Engine power is increased 20 to 25 per cent through the use of this system. Car speed is increased in very nearly the same ratio. Tests have shown that at 60 m.p.h. with a fixed throttle, cutting in the supercharger will raise the speed to 72 or 75 m.p.h. with proportional increases at other speeds.

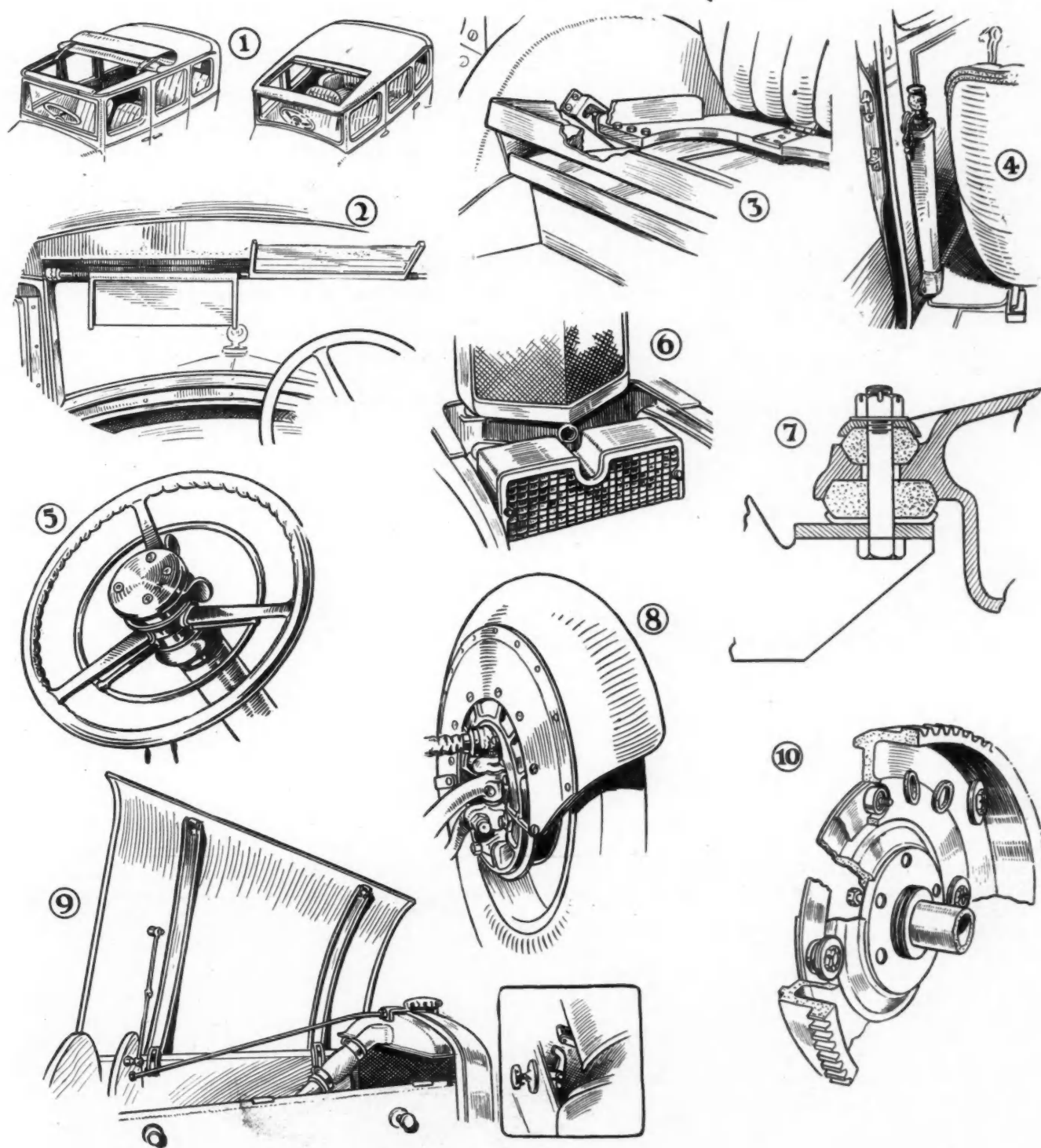
The carburetor employed in the system is a Zenith 105D, of the sealed and balanced type, designed especially for use with supercharging systems. The optional price on the supercharging equipment at the factory in Indianapolis is \$1,500.

### Torpedo Speedster Announced by Stutz



*The Torpedo speedster is powered by a vertical eight overhead camshaft engine, designed and built by the Stutz Motor Car Co. It is said to develop in excess of 115 hp. The car has four-speed transmission worm drive, vacuum-operated hydraulic brakes and noback (a patented device that prevents backward rolling)*

## Details Seen at Olympia



Herewith are shown several sketches of the more interesting details of British cars shown at Olympia, and described in AUTOMOTIVE INDUSTRIES of Oct. 26. 1—The folding and sliding roofs of the Morris cars. 2—Interior visors on the Rover Six. 3—Detail of rear seat adjustment on the Wolseley. 4—Umbrella and case are de luxe equipment on a Wolseley model. 5—Austin controls on the steering wheel

include a ring for operating the horn. 6—The oil radiator of the Sunbeam. 7—Vauxhall flexible engine mounting. 8—Rover Light Six front fender moves with the wheel. 9—Hillman three-piece hood, with screw lock hinges. 10—Fly-wheel of A.C. Six has rubber washers between the bore of bolt holes and distance pieces around bolts, acting as torque vibration dampers

# Daimler Has Aluminum Cylinder And Uses *More Light*

*Duralumin front axle is 15 per  
of former forging; Knight  
cylinder model an*

By M. W.

**I**N a 25 hp. six-cylinder car, introduced by the Daimler Co., Coventry, England, aluminum alloys are used more extensively than ever before in automobile practice, with perhaps the sole exception of the Daimler bus chassis that has been in successful operation during the past two years. The new model has been designed by L. H. Pomeroy, who is now managing director of the Daimler company.

The engine has a bore and stroke of 3.21 by 4.5 in. (217.5 cu. in.) and is in accord with Daimler practice of late years in having steel sleeve valves. It is notable, however, in having a cylinder block of aluminum and a one-piece aluminum head. Its crankcase and sump are also of the light alloy. Advantage has been taken of the fact that the piston reciprocates within the inner valve

which has the exhaust and inlet ports on opposite sides. The exhaust manifold casting on the left of the cylinder block extends forward beyond the foremost exhaust port and there forms part of a transverse passage to which the carburetor flange is bolted. Continuing across the front end of the engine to the right-hand side, the passage turns at right angles into the integral aluminum inlet manifold. On account of the inclination given to the engine to secure a straight-line drive, the inlet manifold slopes downward toward the rear, and at the rear end it carries a sump or cup into which any unvaporized fuel drains. Fuel collects there when starting from cold and gradually evaporates as the engine warms up; or the sump may be unscrewed and emptied. The fuel mixture leaving the carburetor passes across the face of the heated wall at the front end of the exhaust manifold, which forms a hot spot.

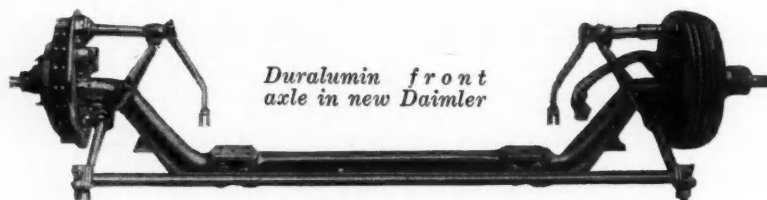
To overcome the normal insufficiency of lubricating oil delivered to the cylinders, pistons and sleeve valves of a cold engine, a new form of primer has been evolved. This consists of a series of open-ended troughs fed with oil by a branched lead from the pressure release valve. The walls of the troughs are slotted, and with the engine cold the lubricant is too thick to run out of the slots, while the oil moving toward the open end of the troughs is met by dippers

sleeve to eliminate liners for the cylinder bores. This unorthodox practice has not been adopted without lengthy tests; it is justified by the facts that the sleeve has only a small travel in comparison with the piston, that it moves relatively slowly and that it exerts very slight side thrust upon the cylinder bore.

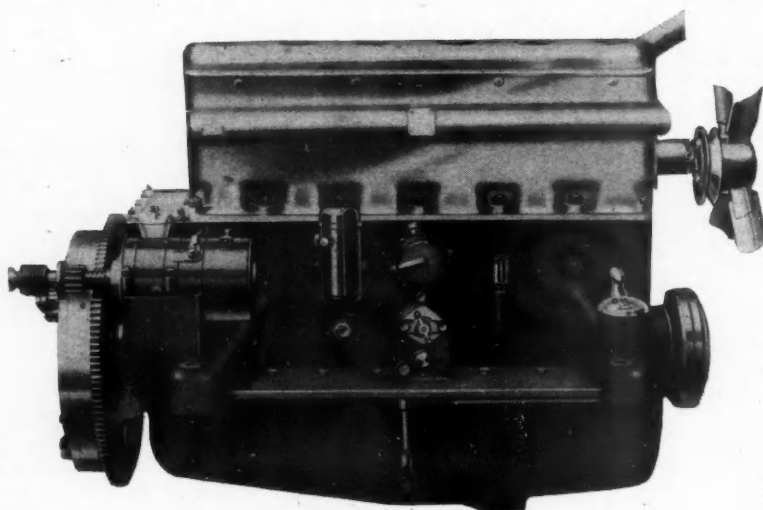
Duralumin is used for the front axle. It is claimed that this axle, with a tensile strength 15 per cent greater than the corresponding steel axle, weighs approximately 50 per cent less. Aluminum is also used for the ends of the frame side rails, the spring hangers, spring shackles, radiator brackets, rear axle center and transmission casing, as well as for numerous minor parts where steel pressings, stampings or castings are orthodox practice. As a result, the chassis weighs only 2550 lb.

Another feature is the use of six of the vertical radiator tubes for oil cooling. These tubes are grouped at the left-hand rear corner of the radiator and connect to the oil circuit by 1/2-in. pipes. This has been found of value on the Daimler bus chassis, where it keeps the oil temperature down to about 130 deg. Fahr. (instead of 190 deg.) with a correspondingly higher viscosity.

A new form of induction tract has been evolved to overcome the usual difficulty of securing satisfactory heat supply in an engine



*Duralumin front  
axle in new Daimler*



*Right-hand side of Daimler aluminum engine*



# Block, Head, Sump and Crankcase Alloys in Chassis

*cent stronger and weighs half that sleeve valves used in six-nounced in London.*

## BOURDON

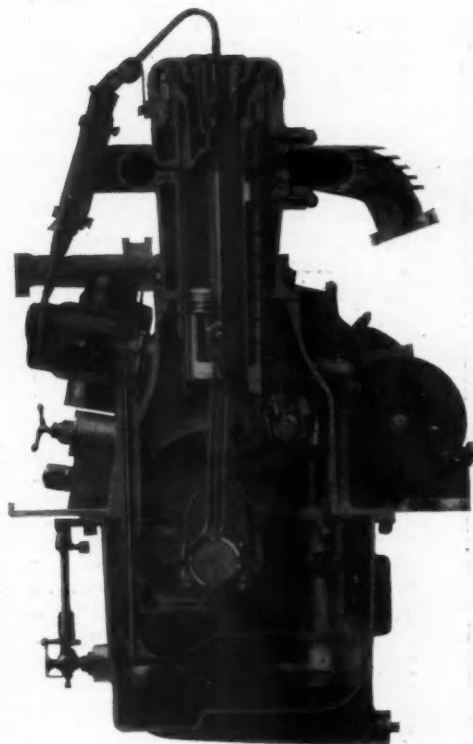
on the connecting-rod caps. This forms a supplementary splash lubrication system. When the oil reaches a temperature of about 100 deg., it runs through the slots in the trough walls and the dippers no longer operate.

In addition to a Lanchester vibration damper at the front end of the seven-bearing crankshaft, a new system of balancing the sleeve valves has been evolved which has eliminated tremors at high engine speeds. The distribution gearing is at the rear end of the engine, driving the generator, water pump and valve operating shaft on the left-hand side.

The clutch is of the single-plate type with a coupling shaft having two flexible disk joints leading to the four-speed, separately-mounted gearset, which is operated by a central control lever. The gear casing of aluminum, is supported by two brackets projecting forward from a tubular cross member of the frame. Final reduction is by an hour-glass, under-mounted worm gear with a reduction ratio of 4.9 to 1.

The rear axle has an aluminum center with steel extensions; the spring platforms are set closer to the rear wheels than usual, this reduction of overhang having been brought about by the design of the hub of the wire wheels, which permit each brake drum to lie almost entirely within it. Vacuum servo operation is provided for the four-wheel brakes, which are adjusted from a

*Transverse section of the Daimler engine, in which the outer sleeves reciprocate in direct contact with the aluminum cylinder walls*



single - point under the engine hood. Compensation is effected only as between the front and rear sets. This is gained by means

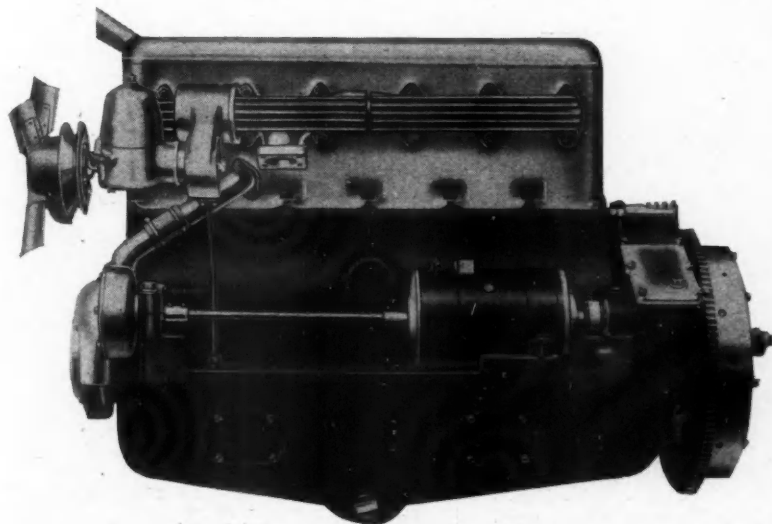
of a short shaft supported in spherical bearings, one rigid and the other attached to a plunger, fixed in a bracket, and having a short range of movement being restricted by buffer springs.

Steering is by Bishop cam and lever gear with spherical joints for the drag-link and cross-rod. Springs are semi-elliptic on the front and rear, and under-slung at the rear. A treadle type accelerator is used. The fuel feed system is an Auto-Vac, with a two-gal. reserve supply tank having control accessible from the driver's seat.

The wheelbase is 133 in.; ground clearance, 7 in., and diameter of turning circle 40 ft.

Silentbloc bushings are used for all spring shackles and brake connections though the brake cross-shafts and pedal shafts are mounted on roller bearings.

With a five-seated sedan body the car is capable of 70 m.p.h. and of accelerating from 10 to 30 m.p.h. in just over nine seconds. It is designed essentially for owner-driver use; for chauffeur-driving a longer wheelbase chassis is offered (142 in.). The price of the short chassis is £750 and the five-passenger sedan costs £1,020 complete. The cars are offered in a wide range of body designs built by custom makers under contract with the Daimler company.



*Left-hand side of the 25 hp. Daimler engine with aluminum crankcase, sump, cylinder block and cylinder head*

# Just Among Ourselves

## Automotive Future Unaffected by Wall Street's Valuation

IT was difficult to find much automotive gaiety lying around loose in the Middle West last week. Steep declines in factory output coupled with nose-dives by motor stocks combined to put a worried look on a good many faces.

When one took the time to sit down and discuss the basis of the present situation with various executives, however, one could not help but feel thoroughly confident and reasonably cheerful about the future—even the immediate future. Certainly there is nothing whatever in the underlying economic picture to make reasonable the terrific decline in motor stock prices which has taken place recently. We have witnessed just another example, automotive men seem to feel, of where stock market performance bears little if any relation to actual conditions.

\* \* \*

## Small Car Projects Gaining Attention

EVERYWHERE one goes about the industry these days it seems as though the conversation eventually turns to small cars selling under the Ford price. With Austin getting ready to go into production with an Americanized version of the British Austin car; with activity in connection with the Martin design; with the Gardner-Sears, Roebuck studies along small car lines announced and with at least one or two other little car designs, either getting ready for announcement or looking for backing, there is more reason for practical speculation about such models than at any time in the history of American industry.

Widespread interest, of course, doesn't necessarily mean success for all or any such designs in the American market. Thus far certainly, nothing of this kind has been successfully promoted over here. Six months ago nearly every experienced automotive

man with whom we talked seemed inclined to dismiss any discussion of such cars for the American market with short attention.

\* \* \*

## Skeptics Have Started to Wonder—Out Loud

TODAY, however, we find hard-boiled engineers, important sales executives and production men all interested in talking about these little cars. Many of them still see little chance of success for them here; but they are interested. A number who previously couldn't see a chance for such cars, today seem to have reached the stage at least of wondering—out loud.

Up until very recently we have been among the hardest of the skeptics. Now we must admit the possibility of a change of heart. Marketing, rather than mechanical difficulties, it has always seemed to us, might be the final stumbling block in the way of getting sufficient volume on these jobs to permit the very low price which seems essential to success over here, operating costs not playing nearly so important a part as they do abroad. Recently we have had pointed out to us some possibilities along the mechanical line which previously we didn't think existed. We're still doing some investigating and will have something more connected to say a bit later.

\* \* \*

## Reversal of Approach a Help for Design Problems

"SEEMS to me," one of the most scientific and best grounded engineers in the industry said to us the other day, "that we may all have been approaching our design problems hind-end-foremost. Usually we start in by designing something to accomplish a given function in the best possible way that function can be performed. Usually we find, then, that we have a fairly complicated piece of mechanism, expensive to pro-

duce. Next we try to figure out how that complex, expensive design can be simplified, whittled down and brought within reason from a cost standpoint.

"Suppose we started the other way around. Suppose we first determined to get together the cheapest, simplest piece of mechanism that would perform the given function at all. Then suppose we worked up from that point, changing, modifying, adding until we reached a design which would satisfactorily perform the function which we had in mind. I really believe that we might be astounded at the cost savings which would be possible if a competent engineer were to study every item on the automobile from that standpoint. Start all over again, as it were.

\* \* \*

## Engine Blocks —by the Mile

"TAKE the engine, for example," this car company engineer continued. "I know you will laugh at what I'm about to say—I laugh at it, too, but it illustrates my point. Today the making of any engine block involves heating of the steel, pouring it into billets, cooling, shipping of billets, heating of billets, pouring again into molds and finally cutting out metal which perhaps never need have been there.

"After all, an engine block basically is just a series of holes with some metal in between. Could we conceive an engine block made out of pieces of pipe welded together? The pipe is made by the mile, cut off by the foot, welded together somehow and there you are.

"Crazy, isn't it? Sure, but I honestly believe we can afford to do a lot of that kind of crazy thinking about the design of automotive parts. . . ."

Personally we are just foolish enough to think there is a lot of saneness in this kind of thinking. We'd be interested to hear what some of you readers think about it.—N. G. S.

# Standard Storage Battery Warranty Adopted by the N. B. M. A.

*Makers agree upon 90-day guarantee, including an adjustment period of 18 months of normal use, at the Cleveland meeting. Ward S. Perry, Vesta Battery Corp., reelected president.*

By W. K. TOBOLDT

A STANDARD passenger car storage battery warranty, guaranteeing the battery for a 90-day period, and including an adjustment warranty for a period not to exceed 18 months of normal use, was adopted by the National Battery Manufacturers Association at the fall meeting, held at the Hotel Hollenden, Cleveland, Ohio, Oct. 24 and 25.

At the election of officers, Ward S. Perry, Vesta Battery Corp., was reelected president of the organization, and W. J. Parker was reelected to the post of commissioner. The other officers are: A. A. MacLean, USL Battery Corp., vice-president; C. O. Wanzig, Globe Union Mfg. Co., second vice-president; R. D. Mowry, Universal Battery Co., secretary; E. Handler, Lyons Storage Battery Co., treasurer; L. A. Doughty, Carlisle & Doughty, director, and Lester Perrine, Perrine Quality Products, director.

The adoption of the standard warranty is the culmination of many months' work on the part of the guarantee committee, with R. D. Mowry of the Universal Battery Co. as its chairman, and with the cooperation of the entire association. In the discussion preceding its adoption it was pointed out that, to be effective, the guarantee should be on both a time and mileage basis. S. W. Rolph of the Willard Storage Battery Co. stated that questionnaires sent to car owners indicated that it was necessary to replace approximately 80 per cent of the storage batteries after 12 months of service, and that therefore a two-year warranty would place an unjustifiable hardship on all battery manufacturers in general and on the

original equipment manufacturers in particular. The complete warranty, as finally adopted, is as follows:

1. The manufacturer guarantees to repair or replace at its option, f.o.b. factory or any authorized service station, without charge to the user, except transportation, any battery of its manufacture which fails to give satisfactory service within a period of 90 days from the date of sale to the user.

2. The manufacturer further agrees after expiration of the 90-day guarantee period to replace with a new battery, on a pro rata basis, any battery which fails in normal passenger car service. Normal passenger car service to be considered as not to exceed 1000 miles per month.

The adjustment period is to be established by the manufacturer, based on the quality of the battery, but in no case to exceed 18 months.

All adjustments are to be based on the current list price, plus transportation charges.

As this guarantee is the result of considerable study, and is based on questionnaires to battery dealers, mail order houses, automobile manufacturers, foreign and domestic battery manufacturers, trade associations and tire and battery parts manufacturers, it is believed by the National Battery Manufacturers Association to best fit the needs of the entire industry.

New recommendations on packing containers with extended handles and horizontal cleats are awaiting the approval of the United



Ward S. Perry, Vesta Battery Corp., who was reelected president of the National Battery Manufacturers Association at the fall meeting held in Cleveland, Oct. 24 and 25



States Bureau of Explosives and the Interstate Commerce Commission, according to D. L. Cole, chairman of the traffic committee of the association. It was also decided that the association should have an exhibit at the New York and Chicago automobile shows.

W. J. Parker, when making his report as commissioner, stated that the results of a questionnaire to the members of the organization indicated that the business outlook is very good, and that storage battery sales, with the exception of radio batteries, had been satisfactory in spite of lower prices and keen competition.

Following the opening address by Mr. Perry, and a speech of welcome by W. R. Hopkins, city manager of Cleveland, T. O. Duggan, merchandising service director, National Standard Parts Association, spoke on "The Dealers as I Find Them." In addition, Harry H. Steidle of the Bureau of Standards gave a brief address on "Standardization," and V. R. Jacobs of the Goodyear Tire & Rubber Co. spoke on the "Future Possibilities of Lighter-Than-Air Craft."

While the exact date of the spring meeting was not set, it will be held in the Hotel Sherman, Chicago.

## Kleiber Announces Heavy-Duty Trucks

**A** NEW heavy-duty line of six-cylinder trucks, comprising four models with capacity ratings ranging from 11,000 to 20,000 lb., and a new four-wheel 2½-ton speed truck, are offered by Kleiber Motor Co., San Francisco. The four-wheel-drive units of the six-wheel models are Timken-Detroit worm-driven tandems, which were described in detail in the *Automotive Industries* of April 27. While varying somewhat in general capacity, number of speeds and assembly, all models are equipped with six-cylinder engines, five or seven-speed transmissions, four-wheel brakes and pneumatic tires.

Continental R engines of different sizes are used in all models, except in Model 34DDT, where a 4¾ by 6 in. Buda GF6 is employed. Stewart vacuum-fed carburetors and Delco-Remy ignition and starting are used throughout. The Robert Bosch generator is used in all models except the 2½-ton Black Panther chassis, which has a Delco-Remy unit.

Brown-Lipe multiple disk clutches and transmissions are common to the entire line, but the gearset in the

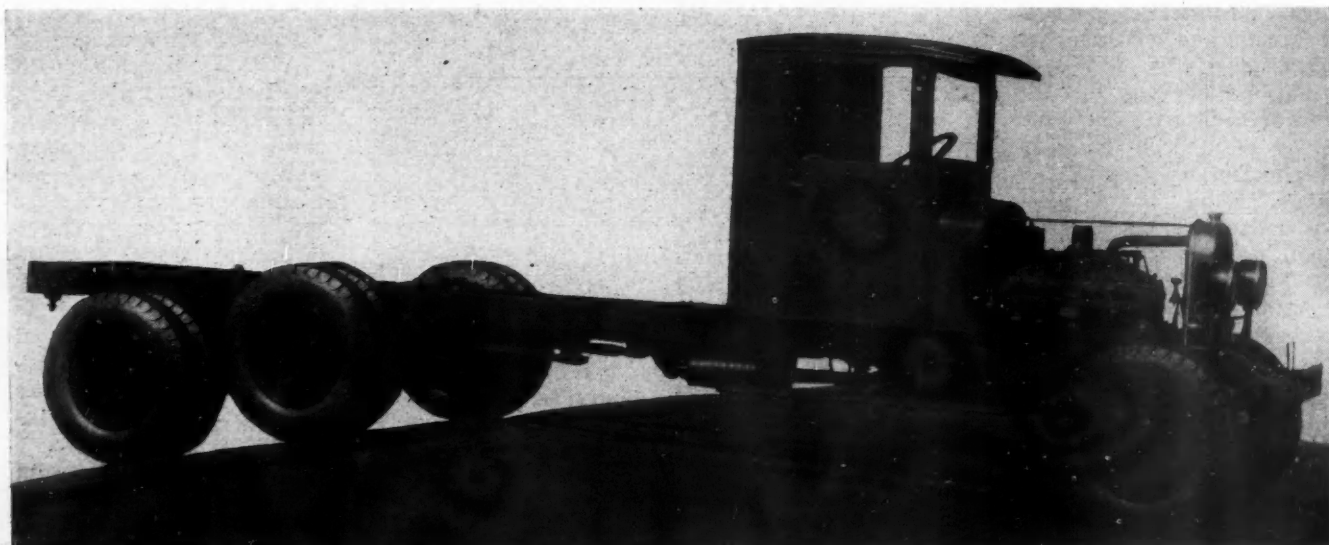
speed model is unit-mounted and provides five speeds, whereas seven-speed amidships-mounted units are used in all the six-wheel trucks. Full-floating type rear axles are standard in the line, the light model having a Timken bevel-gear drive. Radius rods are used in all cases. Other units included in all models include cellular radiators of Kleiber make, Spicer joints, cast-steel wheels, H. W. oil filters, Ross cam-and-lever steering gears and United air cleaners.

Timken internal service brakes are standard on all models, being hydraulically operated on all four wheels of the speed truck and on all six wheels of Model 22DD and Westinghouse air-operated on the three remaining models. The service brake on Model 22DD is actuated by a vacuum amplifier. Tru-Stop 16 in. disk brakes mounted on the propeller shaft are employed on all models for hand braking.

Springs are pin-shackled to the frame. All spring ends are shackled except the front ends of the front springs. Rear springs of the speed truck are equipped with four-leaf auxiliaries.

### KLEIBER SPECIFICATIONS

Model	Black Panther	22DD	28DD	34DD	34DDT
Chassis price	\$3,500	\$5,000	\$6,500	\$7,500	\$9,000
Chassis carrying capacity	6500 lb.	11,000 lb.	15,000 lb.	20,000 lb.	18,000 lb.
Body weight allowance	1200 lb.	2000 lb.	2000 lb.	1500 lb.	2000 lb.
Weight, chassis	6800 lb.	9000 lb.	11,000 lb.	12,500 lb.	14,000 lb.
Wheelbase, standard	190 in.	192 in.	201 in.	210 in.	215 in.
Tires, front, standard	34 x 7	32 x 6	34 x 7	36 x 8	40 x 8
Rear	34 x 7-D	2 sets of duals	2 sets of duals	2 sets of duals	2 sets of duals
Engine	Cont. 16-R	Cont. 18-R	Cont. 20-R	Cont. 21-R	Buda GF6
Size	6-4 x 4½	6-4 x 4½	6-4½ x 4¾	6-4¾ x 4¾	6-4¾ x 6



Kleiber six-cylinder heavy-duty chassis with four-wheel Timken-Detroit tandem drive

# Harder Metals Are Now Workable With Cemented Tungsten Carbide

*"Unmachinable" materials are found to be easily cut  
by tools of this composition. Practice has  
developed new fields of use.*

By DR. SAMUEL L. HOYT

*Metallurgist, General Electric Co. Research Laboratory*

THE tungsten carbide tool material now appearing on the market is the hardest known tool material.

It is capable of scratching even the sapphire, which comes next to the diamond in hardness, while its converted Brinell number mounts to over 2000, as compared to 1000 which we may take as the average maximum for our hardest tool steel. Even these figures do not give the correct idea of the relative resistance to wear, for the carbide tools resist abrasion many times as long as steel does. It combines considerable strength and toughness with this great hardness, for cemented tungsten carbide is about one-half as strong as high speed steel.

In reply to the inquiry that most likely arises as to why it is that tungsten carbide is only now being used, the material having long been known, it may be said that the pure carbide is weak, in any condition that we know, while the usual methods of melting and casting tungsten carbide have always produced a porous, coarse-grained material. It was for the first time, by using the methods devised by Baumhauer and Schroeter, of the Osram Lamp Co., Berlin, that tungsten carbide was made both tough and strong without sacrificing too much of its inherent hardness. This method will be briefly discussed.

## Process of Manufacture

The starting material is tungsten metal powder, similar to the powder used in the manufacture of lamp filaments and other pure tungsten products. It is quite pure and extremely fine-grained. This pure tungsten is converted into tungsten carbide (WC) by mixing the metal with the required amount of carbide and heating the mixture in an electric furnace to about 1500 deg. Cent. for several hours. When properly carried out, this treatment produces a pure tungsten carbide which is but little coarser than the starting material. Pure cobalt metal powder is also made by reduction of pure cobalt oxide. This powder is mixed with the tungsten carbide powder to secure a thorough and uniform mixture, whereupon the mixed powders are ready to be made into tools.

The first step is that of pressing bars, or briquettes, in a hydraulic press in a steel mold. The entire bar is then heated to a red heat to harden sufficiently for handling. In this condition, tungsten carbide can be cut up into smaller bars or shaped approximately to

the shape of the finished tool. In doing so, the shrinkage which accompanies the final sintering must be allowed for. The final operation is that of heating the parts to a temperature of about 1400 deg. Cent. which converts them into a permanently hard condition. This operation is one of sintering, and the result is that the fine particles of tungsten carbide become cemented firmly together by the cobalt. This material contrasts with cast tungsten carbide in that it is extremely fine-grained and contains a strong tough matrix. This product is "cemented tungsten carbide" and is sometimes referred to simply as "tungsten carbide."

## Cobalt Acts as Cement

While the function of the cobalt is to cement the particles of tungsten carbide together, it is also true that the amount of cobalt used affects the hardness and strength of the mixture. Thus greatest hardness and least strength are obtained with low cobalt, of the order of 5 per cent, while much greater strength and toughness and somewhat lower hardness are secured with higher cobalt, of the order of 15 per cent. This is what would be expected from a variation of the relative amounts of a soft, strong constituent, and a hard and brittle constituent. Cobalt contents of 20 per cent and above have been found to be too soft or to wear too rapidly, for use as a cutting tool.

The most common method of preparing tungsten carbide in tool form is by copper brazing a tip on to the end of a steel shank. For this method the shank is first milled out to receive the tip, and here a fairly good fit is desirable, for the better the fit, the better and stronger the joint.

The brazing is done in an electric furnace in an atmosphere of hydrogen, according to the usual technique. Later it was found that the carbide tip may be fastened on by welding the tip and shank around the contact between the two. The shank is first beveled off at the margin and the space left filled in with a welding rod and the atomic hydrogen flame. This is particularly well adapted for use in a shop.

Tools have also been made by uniting the tip and shank by the special cements made for uniting high speed steel tips to a steel shank. It has been found that tungsten carbide tips which are rigidly welded to

Paper presented at the semi-annual meeting of the American Gear Manufacturers Association in Philadelphia.



the shank are only too apt to come off the shank to which they are attached, either directly after the tool is made, or after being put in service. This is due to thermal stresses which are set up by temperature changes and differences in the coefficients of expansion of the carbide and the steel. This circumstance accounts for the popularity of copper brazing, because here the thin layer of copper affords a soft cushion which absorbs such stresses without transmitting them to the carbide tip. On the other hand, copper softens at elevated temperatures, so that it is necessary, in the design of the tool, to move the joint far enough away from the cutting edge so that it does not get dangerously hot during operation. The "welded" tool loses less strength at high temperatures and hence can be made smaller for a given job.

At the start of our work on tungsten carbide tools, the grinding of the tools presented new and unique problems. These arose from the very great hardness of the material, its tendency to chip on the cutting edge and to check, particularly when brazed onto a steel shank.

These difficulties no longer exist. Grinding wheel manufacturers have developed suitable wheels and the producers have developed suitable methods of grinding which have made it possible to grind these tools satisfactorily and economically. This applies to lathe, planer and boring mill tools, as well as to formed tools for automatic machines and to special tools. Wheels of the aluminum oxide type are too soft for effective grinding of tungsten carbide so that silicon carbide wheels are used. Coarse grinding is done on a wheel of grade 60, while fine grinding is done on wheels of grade 100 to 120, or even 200. The hardness of the wheel and the binder used are important factors in the operation. The pressure on the wheel should be light and grinding should be away from the cutting edge to avoid chipping.

#### Lapped With Boron Carbide

Coarse grinding followed by fine grinding puts the tool in good enough condition for ordinary operations. If the tool is to be used for fine finishing work, and if it must be made to a very close tolerance, the edge is frequently lapped with boron carbide or diamond dust to a smooth finish. By this means the tool can be given a very good edge, and, if necessary, be brought to correct size to within a tenth of a mil or so. The lapped edge has been found to have a considerably longer life on such operations than the edge produced by grinding. The boron carbide powder used for lapping runs from 140 to 200 mesh. This works fast at the start and, as the powder becomes finer, produces a reasonably fine finish at the end.

Those who are interested in a more detailed discussion of grinding and lapping tungsten carbide may refer to

an article on this subject in the technical publication "Carbology," Vol. 1, No. 1, which has just recently been issued by the Carbology Co., Inc., which contains a very complete discussion of the subject.

Carbide tools are being used to machine steel, cast iron, non-ferrous metals and alloys, and abrasive materials, as well as materials which have hitherto been classed as non-machinable. The successful application of carbide tools to these machining operations has involved considerable work. While this work is not as yet completed, a good start has been made and some fairly tangible results can now be reported.

The clearance angles of the tool and the shape of the cutting contour which are best suited to tungsten carbide tools differ from those which are used with high speed steel. With this tool design the cutting edge is given the maximum support commensurate with the cutting requirements of the material being machined, while the stresses imposed by the chip are properly taken up by and transmitted to the shank. Both Friedrich Krupp<sup>1</sup> and the Carbology Co.<sup>2</sup> adhere to these general principles, although they differ in some details. The actual angles and shapes recommended can be ob-

tained from these two references and from the trade literature. In all cases the specific application should be considered on account of the variation of these factors from case to case. In general, we may say that the top side rake of a simple turning tool for steel is made 12 to 14 deg., or 4 to 6 deg. less than is common with high speed steel. The front and side clearance angles are made from 3 to 6 deg. If the tool is always set at center, or below, the smaller angle can be used to get the greater support. Perhaps the most unusual feature is the 0 deg. or even negative back rake which is so common.

Another feature is the radius which is ground on the upper surface which curls the chip and increases the life of the tool. The body angle of the cutting edge is increased as the strength of the steel being machined increases.

The cutting angles for cast iron are not greatly different from those used for steel, for general purposes. In this way advantage is taken of the keener cutting edge, a factor which will become more and more important as the speed of machining is increased.

#### Grinding for Non-Ferrous Metals

Non-ferrous metals require, again, different angles. Here it is customary to grind the tool with more of a "hook," by increasing the side rake and by adding a

<sup>1</sup>Roger Prosser, of Thomas Prosser, American representative of Friedrich Krupp, Trans. Amer. Soc. Mech. Eng., May-August issue, 1929, p. 72.

<sup>2</sup>Carbology, October, 1929, p. 10.

## The Product

**"BY using the methods devised by Baumhauer and Schroeter of the Osram Lamp Co., Berlin, tungsten carbide was made both tough and strong without sacrificing too much of its hardness. Pure tungsten is converted into tungsten carbide (WC) by mixing the metal powder with the required amount of carbon and heating the material. . . . Pure cobalt metal powder is mixed with the tungsten carbide powder to secure a thorough and uniform mixture, whereupon the mixed powders are ready to be made into bars or briquettes in a hydraulic press in a steel mold."**

**Dr. Samuel L. Hoyt thus summarizes this new product of metallurgist research in the accompanying paper, which he presented before the American Gear Makers Association meeting on Oct. 24 to 26.**



back rake which may be as great as 14 deg. Within the limits of this discussion, the same may be said of the non-metallics like Bakelite, hard rubber, etc.

The number of individual applications involving many different machining operations and materials to be machined makes it impossible here to discuss this subject in detail, or to discuss it adequately in any other way than in detail, which would be beyond the scope of the present presentation. Even those engaged in the sale of this material discuss only the general principles and leave the individual application for detailed study.

We may turn to some of the accomplishments in the field of machining metals to get the significance of such a tool material when properly applied. The outstanding characteristic of cemented tungsten carbide is its abnormally high cutting efficiency. This cutting efficiency can be utilized in machine shop practice in three ways: to secure greater tool life with about the same speeds, feeds, etc.; to secure higher cutting speeds, or to machine materials which have been classed as non-machinable. A good example of what can be accomplished along the first line is furnished by automatic screw machine work. Here the feeds are light and the speeds are high, while the time involved in setting up the various tools to get the accuracy required in this work becomes an important factor in the cost of doing the operation.

At Schenectady, to quote Mr. Danekind:<sup>1</sup> "One of our most successful applications of tungsten carbide alloy tools for general turning work is in our general automatic machine department. In this department automatic machines of practically every reputable make and size are used to produce parts which vary greatly in material, size, shape and accuracy.

"We are equipping this department entirely with Carboloy turning tools as direct substitutes for high speed steel and Stellite turning tools. The new alloy is increasing the productive capacity of the machines in practically every case.

#### Use in Automatic Machines

"The problem of successful application of tools in this department consists not of the individual performance of a single tool, but rather of a series of multiple tool set-ups where parts are being produced very rapidly on automatic machinery. The tools are not entirely standard because of the varying requirements placed upon them. We have, however, standardized to a great extent so that today our tool investment for producing parts manufactured in this department is considerably less than it was prior to the introduction of Carboloy. . . .

"It makes little or no difference as to the nature of the material being machined with Carboloy, insofar as

savings in machine costs are concerned. It invariably follows that the operating machine hours are appreciably increased even without any definite increase in schedule for feed, speed and cut, due to the greater tool life between grinds. This shortening of idle machine tool time is a tremendous factor in the ultimate cost of automatic machine operation."

In the shop referred to, many different steels and alloys are machined, with continuous and intermittent

cuts, and always at high speeds. The general success which they have attained indicates that most problems connected with the machining of these materials are amenable to economic solution. This would apply not only to automatic machine practice, but to general machine shop practice which utilizes essentially the same types of tools and takes the same type of cuts. The large automatic, multiple head, indexing machines used in production shops for larger work, such as the machining of castings, offer another example of what can be accomplished. Here the speed of operation is likewise increased, while

the hours of useful work are also increased. This type of discussion could be greatly extended, for in the past year, since the introduction of tungsten carbide tools in America, very much has been accomplished; but, on the other hand, our trade literature is continually chronicling these advances, so that they may be eliminated here.

#### New Piston Material

Before leaving this subject, however, I wish to mention one notable achievement which illustrates how a tool material is able to make an otherwise non-machinable material available to industry.

The Reo Motor Car Co. is now using the new aluminum alloy "Lo-Ex" for pistons. This piston alloy was developed several years ago by research metallurgists of the Aluminum Co. of America, and was known to possess valuable properties for this service, one in particular being its low coefficient of expansion. The high silicon content rendered this alloy "non-machinable" with the tool materials available at the time. With the advent of the cemented tungsten carbide tools it became possible to machine these pistons commercially, which is now being done.

The material "Mycalox" offers another example. This compound of mica and glass is the best known insulator for certain purposes, particularly in the radio field, but its great abrasive character made it non-machinable. At present large amounts are consumed and carbide tools are used to machine it.

Not long ago such operations of machining the "non-machinable" could justifiably be classed as "stunts," as undoubtedly many of them were. These two examples and others show that the evolution of a stunt performance into an industrial operation may simply depend on the cutting efficiency of a tool material, and we may expect an extension of this type of work.

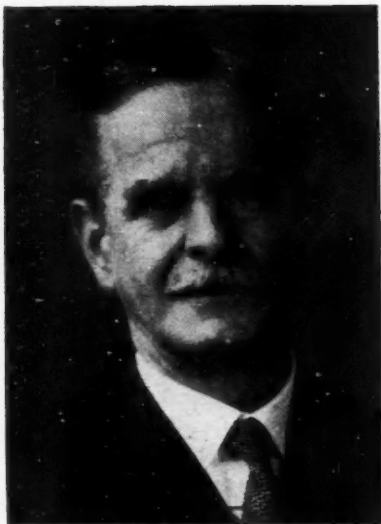
### The Use

**"THE high silicon content of a new aluminum alloy, now used for pistons, rendered this material 'non-machinable' with the tool material formerly available," Dr. Samuel L. Hoyt states in the accompanying article. "With the advent of cemented tungsten carbide tools it became possible to machine these pistons commercially, which is now being done. . . . The evolution of a 'stunt' performance into an industrial operation may simply depend on the cutting efficiency of a tool material, and we may expect an extension of this type of work."**

<sup>1</sup>A. C. Danekind, Carboloy. Sept., 1929, p. 2.

# American Gear Makers Association By Revising Plans to Con-

*The proposal includes the collection  
as production statistics, to the  
practice for herring*



A. F. Cook, *Gears & Forgings, Inc.*, president, American Gear Makers Association, which held its semi-annual meeting in Philadelphia, Oct. 24 to 26

**R**ENEWED activity in the line of commercial standardization was one of the steps decided upon at the semi-annual meeting of the American gear Makers Association, which was held at the Benjamin Franklin Hotel, Philadelphia, Oct. 24 to 26. A new commercial standardization committee was appointed, whose aim it will be not only to revise the standard proposal form adopted by the Association nearly a decade ago, to make it conform to

present conditions, but also to collect and distribute information of commercial interest to the industry, such as production statistics.

Papers were read on a considerable range of subjects, including improved types of cast iron, tungsten carbide tools, the marketing of gears, industrial standardization, and operating conditions of worm gears.

## New Members Elected

Two companies were elected to membership, viz., the Massachusetts Gear & Tool Co. of Woburn, Mass., and the Atlantic Gear Works of Brooklyn, N. Y. The Association amended a section of its constitution whereby the annual dues for the first executive representing each member company are raised to \$75 from \$50.

Resolutions were adopted on the deaths of two prominent members during the past half year, viz., Frank Burgess of the Boston Gear Works and Willis H. Diefendorf of the Diefendorf Gear Corporation.

On Friday, Oct. 26, the meeting was entertained at luncheon at the Benjamin Franklin Hotel by the Philadelphia Gear Works. Mayor Harry A. Mackey, of Philadelphia, welcomed members to the city and spoke briefly on the topic of "City Government and the Man-

ufacturer." No session was scheduled for Friday afternoon and attending members took advantage of the opportunity to visit local gear shops and historical sites.

The usual number of reports were presented by subcommittees of the technical standards committee, but practically all of them were of the nature of progress reports. However, a recommended practice for industrial and high-speed herringbone gearing was definitely adopted. It was announced that the next annual meeting would be held in Cincinnati in May.

## High-Grade Cast Iron

At the first general session on Thursday afternoon a paper on "Gray Iron—a New Material," was presented by E. J. Lowry, a consulting metallurgist of Detroit.

Mr. Lowry said cast iron had lost a great deal of its popularity as a material of construction during the past ten years, and in his opinion this was due to the fact that improvements of the material had not been given sufficient publicity. During the last ten years the consumption of malleable castings had increased 100 per cent and that of steel castings 200 per cent, whereas the consumption of gray iron had increased barely 10 per cent. Improvements in the quality of cast iron had been commensurate with those in the other two materials, but whereas the malleable iron and cast steel industries had promoted the sale of their product by educational advertising, the gray iron industry had been comparatively inactive and depended wholly upon individuals and technical societies to enlighten the interested public regarding the progress made.

During recent years, careful technical control together with mechanical improve-



George L. Markland, of the Philadelphia Gear Works, past president of the Association, took care of the arrangements for the meeting

# Renew Commercial Standards Work form with Present Conditions

*and distribution of information such  
membership. Recommended  
bone gears adopted.*

ments, largely eliminated the causes for the unreliability of gray iron, Mr. Lowry continued. The pattern-maker no longer uses a constant shrinkage factor, but varies the factor and thus eliminates certain strains. The foundryman has improved his melting conditions and obtains surfaces with better finish by sand control and better molding practice.

From the standpoint of the iron founder it is unfortunate that the nomenclature of the industry has not changed with the improvement of the product. In the mind of the average engineer, cast iron is still cast iron. As a matter of fact, there are just as many types of cast iron as there are types of steel. Purchasers have generally bought on a price basis, and nine times out of ten they receive exactly what they pay for. Within the last few years some consumers have attempted to improve their product by specifying the analysis and the Brinell hardness when issuing purchase orders. While this improves the reliability of castings, the industry should go farther and grade cast irons in the same way as steels are graded by the S.A.E. specifications.

## Variety of Semi-Steel

The need for such specifications is well illustrated by the example of semi-steel. This material is made with from 1 to 50 per cent of steel, but all mixtures are covered by the same term. The steel content might well be added to the hardness and strength figures.

"At the present time many foundries operate on a basis of strength control and produce cast irons of between 30,000 and 60,000 lb. per sq. in. tensile strength," Mr. Lowry said. "In comparison with these results the textbook figure of 20,000 lb. maximum looks ridiculous."

Mr. Lowry referred to the special cast irons which have been developed in Germany and England, as well as to those developed in this country by the International Nickel Co. and Ross-Meehan. One company which uses the process of the International Nickel Company consistently obtained over 60,000 lb. in more than 100 heats. For tensile strengths of the order of 50,000 lb. per sq. in. it does not seem

necessary to resort to the use of special processes, as these figures can be obtained by the addition of one or more alloying elements, such as nickel, chromium, molybdenum and vanadium. Each of these alloying elements has certain definite effects, and by combining them in suitable proportions, almost any desired results may be obtained.

In the gear industry and particularly in the automotive branch, cast iron has been losing ground. Engine flywheels, for instance, formerly had the starter teeth cut in them directly, while now these teeth are cut in a steel ring which is shrunk onto the cast iron flywheel. The change was made mainly because of unreliability of the metal and porosity. Price played a big part. If the need for quality material had been impressed upon the consumer the troubles could have been avoided.

## Cast Iron Losing Ground

In the machine tool industry cast iron gears have been replaced largely with bronze and steel gears. Bronze was chosen mainly because of its greater resistance to impact. In some cases, however, alloy cast irons have regained this field for the iron founder.

With an increase in tensile strength of cast irons their impact value also increases—sometimes in direct



*F. W. Sinram, Gears & Forgings, Inc., honorary president of the American Gear Makers Association, who was active in the discussion at the semi-annual meeting held last week*



*B. F. Waterman, Brown & Sharpe Manufacturing Co., chairman of the Standards Committee, A.G.M.A., who presided at the sessions on the technical phases of standards*



proportion and sometimes much faster. In one particular case an increase of 30 per cent in tensile strength was accompanied by an increase of 400 per cent in impact value. This combination of high tensile strength with high impact value is essential in industrial gearing, because of the shocks to the gears when starting machinery.

The author made an allusion to the attempts being made to replace cast iron in machinery frames by welded steel sections and said that, considering the finished product, the material cost is less in the case of cast iron than in that of welded materials or other than gray iron castings. With increase in strength, sections may be lightened and the safety factor be reduced in many instances. To use cast iron successfully, it must be bought on the basis of quality rather than of price; proper specifications must be applied to it, and a definite classification of cast irons must be formulated and adhered to.

#### Personnel of New Committee

The new commercial standardization committee is composed of S. L. Nicholson, Westinghouse Electric & Manufacturing Co.; R. C. Ball, Philadelphia Gear Works; A. R. Ford, Frost Gear & Forge Co.; Howard Dinger, Cleveland Worm & Gear Co., and F. W. Sinram, Gears & Forgings, Inc. Mr. Sinram being chairman. In discussing the work planned for the new committee Mr. Nicholson suggested that it might draft a code of ethics for the industry.

A. A. Ross, chairman, presented the report of the committee on herringbone gears which proposed a recommended practice for such gears. When the committee first set to work it was the intention to limit such items as the helix angle, pressure angle, etc., to a single value, which would have given a real standard, but it was soon found that it would be impossible to get through with such a proposal as herringbone gears at present are being cut with helix angles and pressure angles varying through a considerable range, and as all of them are giving satisfactory service it would have been impossible to induce members using other than the standardized values to give them up.

#### Herringbone Gear Practice

The proposed recommended practice (which was adopted) therefore limits itself to giving a definition of herringbone gears, stipulating that the tooth proportion shall be calculated on the basis of the diametral pitch in the plane of rotation, by which the gear shall be known, and specifying that pressure angles shall be limited to the range 15 deg. 23 min.-25 deg. and helix angles to the range 20-45 deg. Maximum and minimum values are given also for the addendum and the clearance, together with expressions for the dedendum, whole depth, outside diameter, active face, groove width and groove depth. An expression is given for the amount by which the outside diameter of the pinion blank must be increased in order to eliminate under-cutting. A table is given for minimum backlash for different diametral pitches, as well as a formula for the maximum permissible tooth load per inch of face, accompanied by figures

for the permissible working stresses for the various materials used for these gears. At the suggestion of H. J. Eberhardt, a footnote was added that the recommended practice was adopted as an aid toward the formulation later of a definite standard.

#### The Market for Gears

W. E. Kennedy, sales manager of *American Machinist*, gave a talk on "The Market for Gears," illustrated by graphical charts. He pointed out that when any industrial product is to be marketed a four-fold investigation must be made—of the field for the product, of the particular executives in the concern with whom the decision for the placing of orders for the product rests, of the best means of approaching these executives, and of the best kind of appeal.

Gears, he said, are bought by two classes of firms—those who want to use them in their own operations, and those who want to incorporate them in their product for resale to their customers. All industries using gears were enumerated and an effort was made to estimate their proportional purchases of gears. Of course, gears are purchased for re-

sale only by the metal-working industries. A questionnaire sent out by the publication with which the speaker is connected showed that in the great majority of cases the decision as to with what concern an order for gears shall be placed rests with the engineers of the buying company. In trying to secure business for industrial products, Mr. Kennedy said, the best appeal is that to the self-interest of the customer.

There was considerable discussion on Mr. Kennedy's paper. S. L. Nicholson said the opportunity for cooperative advertising was good in the gear business. Mention had

been made by a previous speaker of the fact that many manufacturers of industrial machinery endeavor to make all gears special, so as to assure themselves of the replacement business. The gear industry should educate the ultimate consumer to buy only machines and tools with standardized gears.

The meeting was attended by one of the pioneers of the gear industry, Hugo Bilgram of Philadelphia, who was introduced to members by George L. Markland, Jr. Mr. Bilgram gave an account of the development of his well-known bevel gear shaper. He explained that he was instructor in mechanical drawing at Franklin Institute in 1874 and 1875, and his students had difficulty in drawing the outlines of involute gear teeth correctly. So he gave considerable thought to the subject. At that time there were on the market so-called odontographs, by means of which the correct shapes could be approximated. It finally occurred to him that the tooth outlines could be drawn most accurately by the use of a straight-sided rack which was moved in a straight line relative to the paper and then gave points for the tooth outline. It later occurred to him that if this method was best for obtaining the correct tooth outline, a method of cutting teeth based upon it should also give accurate results, and this finally led to the development of his bevel gear shaper.

Dr. Samuel L. Hoyt of the General Electric Company Research Laboratory presented a paper on "Cemented Tungsten Carbide Tools," which is reprinted

(Continued on page 663)



# New Automotive Developments

## Reed-Prentice Borer and Miller

**I**N the Model No. 5 Jig Borer and Vertical Miller, offered by the Reed-Prentice Corp. of Worcester, Mass., a machine capable of vertical milling with power and finish, is combined with the precision necessary to meet the requirements of jig boring work.

The unit has power rapid traverse in either direction, cross or longitudinal. Main bearings are all Timken mounted, including the precision bearings for the spindle. It has a working table surface of 60 in. by 16 in., with the table height above the floor of 33 in. The general features of construction are shown in the accompanying photograph.

As a jig borer the machine will

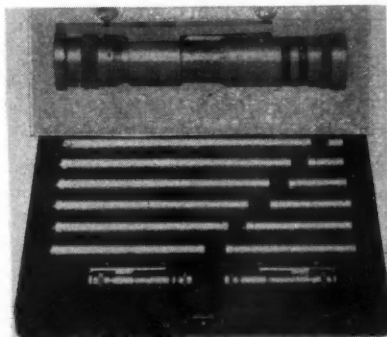
bore, drill and ream to ten-thousandths in.

Power down feed to spindle is built into the head of the machine, and three speeds, .0025, .005 and .010 are available through the operation of a lever at the top of the gear box.

Vernier scales are provided for cross and longitudinal feeds, which are equipped with rapid power traverse in either direction. For greater accuracy in work on jigs and fixtures, brackets with V-blocks are provided for holding measuring bar and microm-

eter head (shown in smaller of the accompanying illustrations) placed between the adjustable stops and dial gages attached to saddle and table. Two micrometer heads with 12 measuring bars provide adjustments ranging from 1 in. to 12 in. by ten-thousandths. Holes are located accurately with direct readings. Positioning of table and work is controlled by end measures inside micrometers and dial indicators.

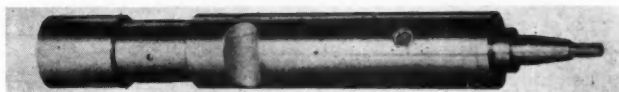
Shipping weight of the complete installation is 11,000 lb. and the floor space required 118½ in. by 95½ in. by 105½ in.



Micrometer head (above) used with Reed - Prentice No. 5 miller and 12 measuring bars (lower view)

## Ex-Cell-O Grinding Spindle

**T**HE Ex-Cell-O Aircraft & Tool Corp. announces a new surface grinding spindle which utilizes the same fundamental principles of design as the company's former models. It is equipped with the same high-speed



Ex-Cell-O abrasive surface grinder spindle

Ex-Cell-O ball bearings as are all other spindles made by the company. After assembling, each of these ball bearings undergoes a final developing operation which consists of running-in the bearings with a fine grinding compound, which develops an almost imperceptible track in the races, leaving the balls and races with an



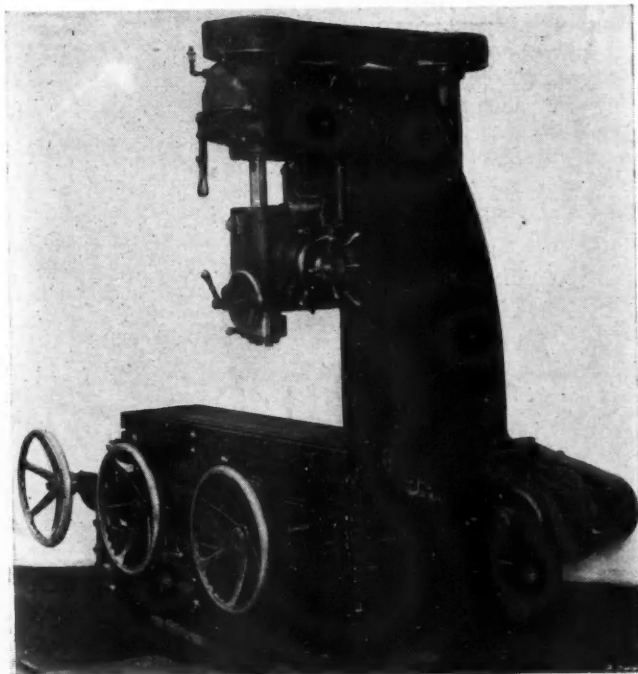
Ex-Cell-O internal grinding spindle developed for the Greenfield Tap & Die Corp.

extremely accurate fit. End play and radial shake are said to be practically eliminated. It has a maximum speed of 6000 r.p.m.

An internal grinding spindle has been developed by the company especially for the Greenfield Tap & Die Corp.'s No. 12 Hydromatic Grinder. This is one of a number of special spindles developed by this company.

## Westinghouse Centrifuge

**A** SHARPLES super-centrifuge combined with Westinghouse filter press equipment, the whole being mounted on a truck, is being offered by the Westinghouse Electric & Manufacturing Co. It is claimed for this combination that it thoroughly cleans 1200 gal. of oil per hour, completing the purification in one operation, the process being continuous. The equipment occupies little floor space (54 by 106 in.), and can be easily moved from place to place. Practically no oil is said to be lost in handling, and the operation is simple and clean. The outfit meets requirements where large quantities of oil have to be cleaned.



Reed-Prentice No. 5 vertical miller and jig borer

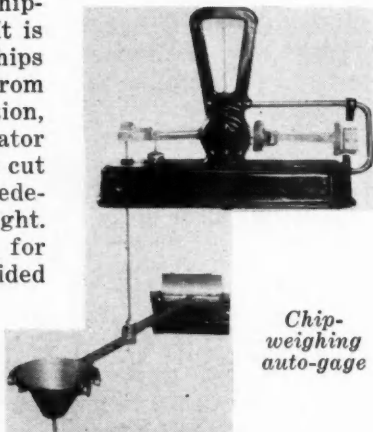


## Chip-Weighing Gage

A DEVICE for use in bringing parts down to a standard weight has been placed at the disposal of automotive and other manufacturers by Toledo Precision Devices, Inc., Toledo, Ohio, in the form of a chip-weighing auto-gage. It is designed to measure chips by weight as they fall from a machining operation, thus letting the operator know when to stop the cut in order to obtain a predetermined finished weight.

The correct weight for the piece is first decided upon. Then each piece (as it comes to the cutting machine) is weighed on a scale to determine its amount of overweight. The

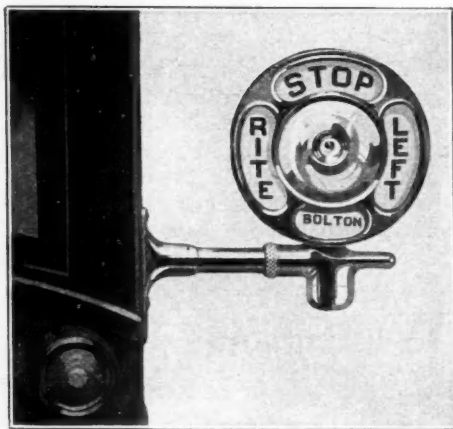
poise on the beam of the chip-weighing auto-gage is moved to the figure on the beam which corresponds to the amount of overweight. The piece is placed in the cutting machine and the cut started. The chips fall into the pan and when they weigh the amount for which the poise is set, the indicator will move quickly across the chart. The cutting machine is stopped and the piece should then weigh the correct amount. The chips are dumped from the pan by means of a convenient lever arrangement and the whole process is repeated.



Chip-weighing auto-gage

## Bolton Safety Signal

A COMBINATION luminous signal for motor cars has been placed on the market by the Bolton Safety Signal Co., 105 W. Monroe St., Chicago. It combines the elements of a right-and-left-turning sig-



Bolton combination signal

nal, stop light, spot light, parking light and rear-view mirror. It indicates both a left and a right turn, and the indications are visible both forward and backward. When the brakes are applied, the red stop light lights up, and this is also visible in both directions. Another feature of the signal is a spot light or driving light, which can be adjusted to any angle. As a parking light

the signal shows both forward and backward, and as a rear-view mirror it can be adjusted as required.

The signal is mounted on the left front post of the car, through which a  $\frac{3}{8}$ -in. hole is drilled. The wires leading to the signal are concealed and protected in the front post. All controls and adjustments are on the inside of the car. There is a direct wire to the toggle switches, and friction contacts are done away with. Location of the signal on the front post is considered particularly suitable, since following drivers look there for signals.

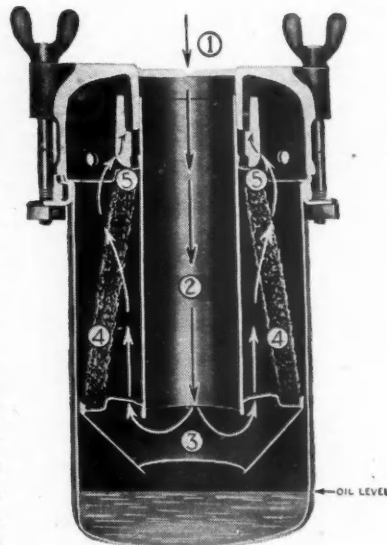
## AC Triplex Air Cleaner

A NEW heavy-duty air cleaner, very efficient under all operating conditions, and designed especially for buses, trucks and tractors, is announced by the AC Spark Plug Co. The new cleaner is adaptable to all engines, regardless of size.

The cleaner is called the "Triplex" because it not only has three stages of air cleaning, but also serves a triple function: viz., air cleaner, flame arrestor and carburetor muffler. The first stage of cleaning is through the stack or chimney on top of the cleaner, which supplies air from high up under the hood, or, in the case of a tractor, 3 or 4 ft. above the cleaner, where the air supply is relatively pure. The second stage of cleaning is by impingement of most of the dust into the oil supply in the bottom of the cleaner as the air makes a sudden reversal upward. The third stage is the hollow cone of oil-wetted copper mesh through

which the air passes on its way to the carburetor. This third stage removes the small percentage of dust not removed in the second stage.

According to H. G. Kamrath, AC air cleaner specialist, tests have shown that nearly all of the dust entering the cleaner itself is collected in the oil supply, leaving only a small portion to be caught on the last stage. When necessary, the second and third stages can be easily cleaned. This is done by loosening the two wing studs.



AC TRIPLEX AIR CLEANER

1. Dust-laden air enters cleaner.
2. Column of dirty air passes downward through central tube.
3. Dust-laden air enters oil chamber and due to impact and sudden reversal most of dust is thrown into the oil and settles to bottom.
4. Partially cleaned air passes upward into the second-stage cleaner, where all remaining dust is caught by the oil-wetted filter.
5. Perfectly cleaned air flows to carburetor intake

## Two-Stage Oxygen Regulator

THE Oxweld Acetylene Co., New York City, has added to the Prest-O-Weld line a two-stage oxygen regulator, designed to eliminate fluctuation in working oxygen pressures. This regulator, which is designated the Type R-109, incorporates the stem-type valves, which



have proved extremely satisfactory in single-stage regulators.

The chief feature of the improved design is two-stage pressure reduction, accomplished through the medium of two independent sets of diaphragms, valves and springs. Instead of reducing the full cylinder pressure of about 2000 lb. per sq. in. down to working pressure, which is often only a few lb. per sq. in., in one-stage, the R-109 regulator reduces through this wide range in two stages. In the first stage the cylinder pressure is reduced through a non-adjustable reducing valve to about 175 lb. per sq. in. Leaving the first stage the oxygen passes to a second valve and diaphragm assembly, where the pressure is reduced to that desired by the operator, the second-stage reducing valve being adjustable by means of the hand wheel.

The Type R-109 oxygen regulator supersedes the Type R-105. It is provided with 3000-lb. and 100-lb. gages, and is equipped with a  $\frac{1}{4}$ -in. ferrule hose connection.

## Deep Hole Driller

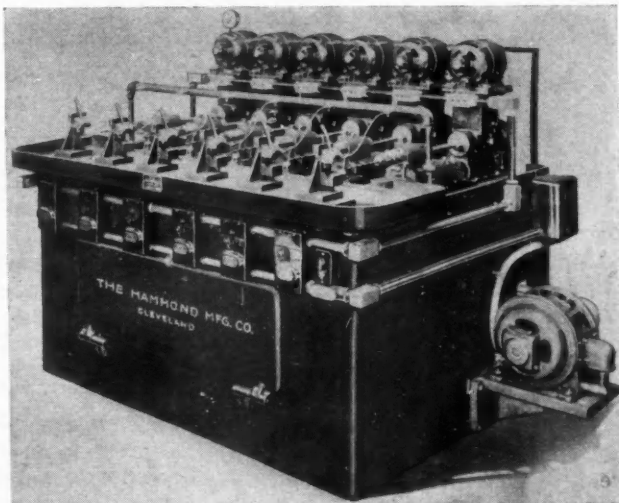
**A** NEW deep hole drilling machine is introduced by the Hammond Manufacturing Co., Cleveland.

This machine has six horizontal drilling units, each driven by a  $\frac{1}{2}$  hp. motor. Spindle speed changes are effected through change pulleys. Drill feed is accomplished by hydraulic control, while feed variations in advance and withdrawal are controlled by individual cams.

The camshaft makes 10 revolutions per minute and therefore the spindles advance to the work, drill and withdraw from the work at the rate of 10 cycles per minute. The mechanism is so designed that in the first drilling period the penetration of the drill under feed pressure is the maximum. As the hole becomes deeper the drilling period automatically shortens, thus diminishing the amount of penetration per cycle. An adjustable stop may be set so that at the desired depth the drill will withdraw and stay back; the operator then reloads and engages the feed to repeat the drilling operation.

The drill is entirely withdrawn from the work at each cycle, thus becoming thoroughly cooled and allowing the hole to receive a liberal supply of coolant. Any spindle may be stopped independently of the others for the purpose of changing drills.

A large chip chute is provided, directly under the



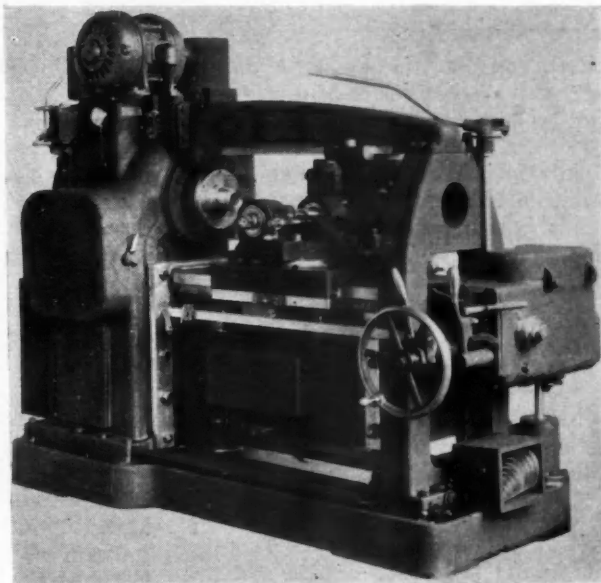
*The Hammond deep hole drilling machine*

drills. The chips fall into a basket which can readily be removed from the front of the machine.

Floor space required is 5 x 6 ft. Net weight is approximately 5000 lb.

## Production Hobbing Machine

**B**ARBER-COLMAN CO., Rockford, Ill., have placed on the market a new production hobbing machine, Type B, designed for roughing and finishing spur gears,



*Barber-Colman Type B production hobbing machine*

spline shafts and work of similar nature. Distribution of metal and the proportions of component parts are said to have been given special attention in order to adapt this machine to the present requirements of high speeds and feeds.

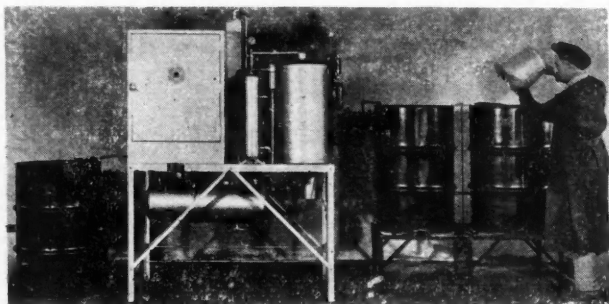
The principal features are: The simplified gearing and drives; use of roller and ball bearings; worm and worm gear final drive to hob; the hob spindle drive is outside the bed, yet the hob may be swiveled on a center under the work; the work spindle is in a housing fast on the base, the work diameter being controlled by an elevating bed; a unit pressure oiling system; automatic continuous lubrication of the feed box; hob slide power rapid traverse; centralized interlocking controls; direct connected motor drive; hardened spiral bevel gears throughout and screw and micrometer dial for positioning hob.

This machine provides eight changes in hob speed, from 55.1 to 159.4 r.p.m. The motor is  $7\frac{1}{2}$  hp. at 1750 r.p.m. Required floor space is 42 in. by  $92\frac{1}{2}$  in.

## Skinner Oil Reclaimer

**F**OR the reclamation of used crankcase oil the Skinner Automotive Device Co., Dalzelle and Fourteenth St., Detroit, Mich., manufactures the oil reclaimer of which an illustration is shown herewith. Electric heat is used for driving off the volatile material. The used engine oil, after a period of settling in convenient drums, is refined in vacuum in an electrically heated still. The process is continuous and is safeguarded by automatic controls to insure uniformity and reduce the operating cost.

The volatile vapors which are driven off are condensed



Skinner oil reclaimer

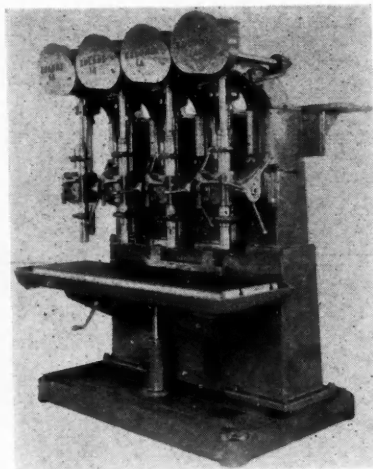
and collect in a tank below the machine. Next the oil is passed through a series of filters which are said to catch and remove all dirt and abrasive. Cleaned oil from the filters flows by gravity into a storage drum or tank.

This oil reclaimer, we understand, has been found particularly adapted to the needs of flying fields, and the War Department Air Corps recently ordered eleven of them for installation at government flying fields in Ohio, Texas and California.

## Edlund Drilling Machine

**T**HE No. 1A 24-in. production drilling machine with capacity of 1½ in. in steel, is announced by the Edlund Machinery Co., Inc., Cortland, N. Y.

The machine is open in the back to allow for the use of extra counterweights for multiple head drilling. These weights may be taken off or put on as required.



Edlund production driller

Hardened steel change gears are used in the gearcase at the front of the machine. The jackshaft which carries the large change gear also carries a spiral bevel pinion driving a gear mounted on a four-splined broached sleeve which in turn drives the spindle. The

power feed is driven through a train of gears with change gears at the top so that the feeds ranging from .006 to .028 in. per revolution may be obtained.

This machine is furnished with either hand or power feed but not with a tapping attachment. Spindles may be either No. 3 or No. 4 Morse taper and may be flange quill if required. This machine can be built up to four spindles and may have riser blocks if required.

The motor is mounted on a sliding bracket so that it may be removed and replaced if necessary. It is connected to the driveshaft through a flexible coupling which takes care of any slight inaccuracy of alignment.

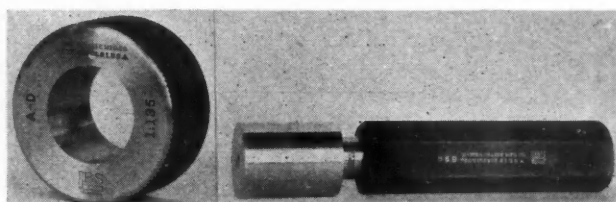
## B. & S. Gage

**T**HE Brown & Sharpe Mfg. Co., Providence, R. I., offers gages conforming in design to the standards specified by the American Gage Design Committee.

These are made of high-grade tool steel, heat-treated, hardened, ground and lapped. They are made in both plug and ring types and in both "go" and "not go" in each style.

The plug gages No. 659 are furnished in Go and Not Go styles and with either single or double end handles. The Go gages are distinguished from the Not Go gages by their longer measuring surface. They are furnished in any size or combination of sizes from .241 to 1.510.

The ring gages No. 664 are furnished in Go and Not Go styles, in any size or combination of sizes, from .241 to 1.510. The smaller rings, ranging in size from .241 to .510, are of a two-piece construction with a hardened, ground and lapped bushing inserted in a soft gage body. The larger rings, sizes .511 to 1.510, are



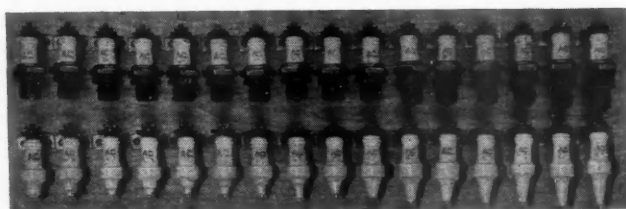
Brown &amp; Sharpe No. 664 ring gage (left) and No. 659 plug gage (right)

of solid stock, hardened, ground and lapped. The Not Go gages are distinguished from the Go gages by the groove running around them.

## AC Heat Range System

**A** NEW line of spark plugs, providing a heat range for practically every operating condition, has been introduced by the AC Spark Plug Co., Flint, Mich.

The complete line includes several new metric plugs and the new 7/8 in. size designed for buses and trucks. Selection is now possible of plugs suitable for every type of gasoline engine used in passenger cars, buses, trucks, airplanes and industrial applications.



Part of AC Spark Plug line in selective heat range order

**I**T has been proposed to the French Minister for Air—and the plan has been tentatively accepted—that a common fund be established in France for the benefit of air clubs, which shall be kept up from an assessment of one per cent on all orders placed with manufacturers of aircraft. The fund is to be administered by a Federation of Air Clubs of France, to be organized for the purpose. In England a National Flying Service has been organized for similar purposes, that is, for flying propaganda. One of the conditions imposed by the British Government before it consented to grant the services an annual subsidy of approximately \$40,000 for ten years was that the organization should raise a capital of \$1,700,000.



## Gear Manufacturers Renew Standards Work

(Continued from page 658)

elsewhere in this issue. In the discussion Dr. Hoyt stated that cutting alloys of the cemented tungsten carbide type are now being marketed in this country by four different concerns, under different trade names, viz., the Firth-Sterling Steel Co., the Ludlum Steel Co., the Carboloy Corp. and the Friedrich Krupp Co. These alloys are made under the same patents, but the proportion of cobalt varies.

### Use in Broaches

Perry L. Tenney of the Muncy Products Division of General Motors Corp. asked about the possibility of using cemented tungsten carbide for broaches for correcting the holes through case-hardened automobile transmission gears for distortion in hardening. Dr. Hoyt said it was somewhat questionable whether the material was practical for that use, as the amount of material removed would be very slight, so that there was generally a decided abrading action.

L. F. Burnham of the Nuttall Gear Works presented a progress report for the Committee on Gears and Pinions for Railways, Mills and Mines, which was adopted. This committee is now working on the proposition of standardizing a non-resonant gear.

The report of the Tooth Form Committee, H. J. Eberhardt, chairman, was in the form of a reply to an inquiry received from Prof. U. C. Holland of the University of Pennsylvania, relating to the different tooth forms standardized by the Association.

Dr. P. G. Agneau, secretary of the American Standards Association, spoke on the "Role of the Trade Association in Industrial Standardization Work." He said no less than 300 trade and industrial associations are now cooperating with the A.S.A., most of these being national in scope.

The Worm Gear Committee, W. H. Himes, chairman, presented a proposed nomenclature for worm gears. This covers 50 different items and is arranged in the same way as the nomenclature charts for other forms of gearing, that is, there are six columns containing, respectively, the number of the term, the term, the abbreviation of same, a definition, a formula and a sketch.

### Chains and Sprockets

The Sprocket Committee, G. M. Bartlett, chairman, made a report reviewing the action of the Sectional Committee of the American Standards Association on Transmission Chains and Sprockets, which standardization is sponsored jointly by the A.S.M.E., the S.A.E. and the A.G.M.A. This sectional committee held five meetings and then submitted a final report, which suggests a number of changes in the present A.G.M.A. recommended practice for transmission chains. For instance, the column of minimum breaking strengths is omitted, the  $\frac{3}{8}$ -in. pitch chain is to be of the rollerless type with a 0.200-in. bushing,  $\frac{3}{16}$ -in. width and 0.141-in. pin. The test load is to be 555 lb.; the measuring load, 17 lb. and the standard chain number 35-N.

The  $1\frac{3}{4}$ -in. pitch chain has 1-in. width and 0.219-in. thickness of side plate.

The  $2\frac{1}{2}$ -in. pitch chain has  $19/16$  in. roller diameter, and a width of  $1\frac{1}{2}$  in.

In the column headed "Standard Chain No." the letter "W" is omitted.

A new series of chains with pitches of from  $\frac{3}{4}$  to 3 in. is recognized, having the same proportions as the standard series, but with thicker side plates. This series is to be known as the Extra Heavy Series. The chain numbers are the same as those of the corresponding pitches in the standard series, with the letter "H" appended.

The formula for minimum breaking strengths is abolished. A light weight machinery chain to be designated as No. 41 is recognized as standard. Its pitch is  $\frac{1}{2}$  in.; width,  $\frac{1}{4}$  in.; roller diameter, 555 lb.; measuring load, 17 lb.

To insure interchangeability between connecting links as produced by different makers of chains, standard maximum and minimum tolerances were adopted for the guidance of the manufacturers. They are not the actual tolerances to be used in manufacturing, but rather the limiting tolerances (maximum and minimum) within which it is necessary to keep in order to insure the desired interchangeability.

At the final session on Saturday morning, Emil Dukes of Gears & Forgings, Inc., read a paper on "Load and Speed Conditions of Worm Gear Drives." He described some tests on two worm gear speed reducers which have been carried out at Case School of Applied Science in Cleveland. Power is supplied to the worm by an electric dynamometer, which at the same time measures it, and the power delivered by the shaft is absorbed and measured by a Prony brake.

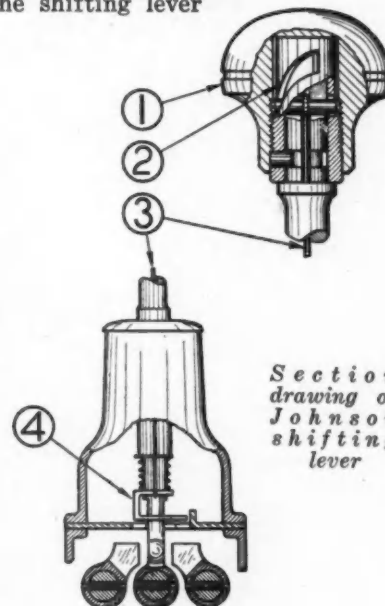
## Johnson Shifting Lever

A HAND-BALL control shifting lever for four-speed transmissions has been developed by the Johnson Lock Co., St. Louis. The safety latch

is concealed within the shifting lever

housing and is engaged or disengaged by a quarter-turn of the hand-ball. An examination of the accompanying drawing shows the simplicity of this arrangement. A quarter-turn of the ball 1 turns the spiral cam 2, which pulls the connecting link 3. This raises the safety latch 4 and permits shifting into reverse. When the lever is returned to neutral, the safety latch automatically drops into its locked position.

In appearance the hand-ball shifting lever is similar to the ordinary three-speed transmission lever, as it has no external exposed mechanism.



Section drawing of Johnson shifting lever



# News of the Industry

PAGE 664

VOLUME 61

Philadelphia, Saturday, November 2, 1929

NUMBER 18

## Downward Trend Continues As October Output Slumps

PHILADELPHIA, Nov. 2—As the automobile industry rounded out the last few days of October, the downward trend of production continued and it was doubtful if the total production for the month, taking the United States and Canada as a whole, would reach 400,000. Plants will be closing soon, as is usual for the end of the year. The industry produced 415,000 passenger cars and trucks during October, 1928.

Ford production may emphasize this recession trend if the announced schedule of this company is carried out. It is expected that Ford will produce 170,000 units during October, which will leave but 191,000 to be produced during the months of November and December to bring the year's production to 2,000,000 estimated as the approximate total for 1929. This will effect a drop of nearly 50 per cent for the remainder of the year.

Oakland has shut down its plant and is in anticipation of next year's production. Oldsmobile and Viking plants have closed and will reopen about Dec. 1. A number of other manufacturers are planning to close soon.

It is believed in informed quarters, however, that total production for the year in the United States and Canada will be about 5,500,000 units, as predicted some months ago by *Automotive Industries*. Generally favorable sales in all parts of the country bear this out. In spite of the usual seasonal decline, sales executives report that dealer deliveries are continuing satisfactory.

### American Club Elects

PARIS, Oct. 28—The American Automotive Club of Europe recently elected officers as follows: S. H. Diman, European manager, Graham-Paige Motors Corp., president; Blake Ozias, managing director, S. A. Ozias & Co., first vice-president; W. F. Bradley, correspondent in Europe for the Chilton Class Journal Co., second vice-president; H. C. Schuette, assistant automotive trade commissioner to Europe, secretary, and Charles K. Powell, Autostation, treasurer. The club has headquarters in Paris.

### Will Build Wyoming Plant

NEW YORK, Oct. 30—The Prest-O-Lite Co. is planning the immediate construction of an acetylene producing plant at Casper, Wyo., to be completed by May 1.

### Guggenheim Fund to End Operation

NEW YORK, Oct. 31—The Daniel Guggenheim Fund for the Promotion of Aeronautics will cease to operate in its present capacity at the end of this year. This body will conclude its existence with important additional grants to schools and colleges, and with the establishment of an Airship Institute.

### Urges More Attention Paid to Small Tools

DETROIT, Oct. 31—A request for the same attention to small tools that is accorded machine tools, as to purchase, selection and maintenance, was the keynote of an address to the Detroit section of the S.M.E. by A. N. Goddard, of Goddard & Goddard, producers of milling cutters.

According to Mr. Goddard the principles underlying the design of efficient cutting tools are rather well appreciated but delegation of the design and selection to underlings often produces "cutting tools" which really do not cut at all, such as milling cutters radially gashed without rake.

### State Rejects Gasoline

BISMARCK, N. D., Oct. 28—Stringent state laws are giving North Dakota very high grades of gasoline and oils, according to State Inspector F. L. Gage.

One hundred forty cars of gasoline and other fuel have been rejected in the state so far this year because they fall below the classifications of the state law. North Dakota has adopted in full the rules of the Federal Government requiring certain standards of purity in gasoline and oil.

## Motors Rise Slowly After Market Crash

Average Yield of 13 Automobile Stocks Reaches \$7.85  
a Share in Decline

PHILADELPHIA, Oct. 31—Resumption of large buying orders yesterday with a resulting appreciation in the value of leading issues marked the apparent closing of one of the wildest trading periods in the history of the New York Stock Exchange. Motor stocks were hard hit by the general sagging of the market. Reckoning from Oct. 1, 15 representative motors suffered a decline in value of \$1,689,840,902 up to the close of trading on Tuesday of this week.

Calculated on the basis of Tuesday's closing prices, the average yield of 13 motors reached \$7.85 per share.

Tuesday's trading on the Exchange reached a total of 16,410,030 shares, as compared with 10,727,320 shares on Wednesday. With the exception of General Motors, automobile issues appreciated slowly with the improved trading on Wednesday. The record of 14 motors during the critical period follows:

	Tues. Close	Wed. Close	Net Change	Shares Traded Wed.
Auburn .....	130	180	+50	2,500
Chrysler .....	33½	35	+ 1½	95,100
General Motors	40	49¾	+ 9¾	414,700
Hudson .....	45	51¾	+ 6¾	19,300
Hupp .....	20½	24	+ 3½	17,100
Mack .....	65½	75¾	+10½	22,500
Marmon .....	28	25¾	- 2½	4,500
Nash .....	45	54¾	+ 9¾	39,200
Packard .....	16¼	19½	+ 3¼	182,900
Peerless .....	5½	9	+ 3½	3,200
Reo .....	11½	12½	+ ½	12,800
Studebaker ...	46	46¾	+ ¾	28,500
White .....	33½	34¾	+ 1½	7,600
Willys-Overland	10	11	+ 1	56,000

The average gain in points of the 13 motors which appreciated during Wednesday's trading was 7.8, as compared with an average gain of 14.33 points for 15 leading industrial issues. General Motors was exceeded only by American Telephone and Telegraph in gross appreciation in monetary value, however.

### Executives Discuss Market

INDIANAPOLIS, Oct. 30—On the recommendation of G. M. Williams, president, directors of the Marmon Motor Car Co., at a special meeting held today, voted the regular quarterly div-

idend of \$1 per share on the common stock, in advance of the usual due date. Mr. Williams pointed out that with the present weakened condition of the stock market, it was the duty of corporations in good financial shape to inspire confidence by this means.

Reactions of automobile executives to the decline of the stock market resulted in the following statements during the week:

"There is nothing fundamentally wrong with the automobile industry . . . stock market quotations have ceased, at least for the present, to have any meaning or value in measuring the worth of a corporate stock . . . we look for a sounder, healthier, better year for the Reo Motor Car Co., and the automobile industry in 1930." (Richard H. Scott, president, Reo Motor Car Co., in a letter to stockholders.)

"Our companies have had a good year . . . the volume of business has been good with reasonable profits. New business is before us in greater volume than ever before. There are no large capital expenditures and all our plants are in the very best condition . . . most industries are similarly situated." (Edward G. Budd, president, Edward G. Budd Mfg. Co., and Budd Wheel Co.)

John N. Willys, on returning from Europe Monday, expressed his opinion that motor stocks were sufficiently sound to recover from the shocks sustained in the present stock market activity.

## Work Will Soon Start

### on New Auto-Lite Plant

TOLEDO, Oct. 31—A new plant unit which will involve investment of \$1,000,000 and result in boosting 1930 business of the Electric Auto-Lite Co. by 50 per cent, is scheduled to be completed by Jan. 1, it was announced by C. O. Miniger, president of the company.

It was reported that contracts with the Ford Motor Co., calling for much larger volume of starting, lighting and ignition equipment than had heretofore been produced by Auto-Lite, had been signed.

### Studebaker Shows 9 Month Gain

SOUTH BEND, IND., Oct. 31—The Studebaker Corp. of America reports net profit for the quarter ended Sept. 30 of \$2,539,014. This includes \$527,558 as its share of Pierce-Arrow profits. This is equivalent after preferred dividends to \$1.25 a share on common stock and compares with profit of \$4,147,436, or \$2.14 a share, in the corresponding quarter a year ago. Earnings for the nine months' period ended Sept. 30 were \$13,419,871, including \$1,950,672 from Pierce-Arrow, equal to \$6.72 a share on common stock and compared with \$12,730,732, or \$6.58 a share, for the corresponding period a year ago.

### Opens Detroit Office

NEW YORK, Oct. 30—Robert Bosch Magneto Co., Inc., has opened a sales office in the General Motors Building in Detroit for the convenience of its manufacturer and trade customers.

## Air Budgets Cuts Reach \$10,000,000

WASHINGTON, Oct. 30—The Budget Bureau has reduced by \$4,500,000 the allowance requested by the War Department for the Air Corp in its tentative budget. A similar reduction expected in budget allowances for the Naval Bureau of Aeronautics and an anticipated decrease of more than \$3,000,000 in the amounts to be paid to air mail contractors during the coming fiscal year would bring the total decrease in the total allowance asked for the aviation activities of the government to well in excess of \$10,000,000. The Air Corp's tentative budget aggregated about \$40,000,000.

## Federal Specifications Are Proposed for Trucks

WASHINGTON, Oct. 31—The Federal Specifications Board has issued tentative specifications for three classes of trucks, Classes AA, A and B. Class AA is a ¾-ton two-wheel drive truck; Class A, a 1½-ton two-wheel drive truck or a 1½-2-ton four-wheel drive truck, and Class B is a 5-ton two-wheel or four-wheel drive truck. Data on six-wheel trucks with drive by the four rear wheels or on six-wheel drive trucks will be taken into consideration if any proposals on such models should be received.

## Promotes Executives

DETROIT, Oct. 31—J. W. Frazer, sales manager of the Chrysler Sales Corp., has announced the appointment of R. M. Rowland as director of advertising, John H. Caron, assistant director of advertising, and Fred R. Cooper as director of distribution, which post has just been created.

### Cord Returns Monday

NEW YORK, Oct. 31—E. L. Cord, president of Auburn Automobile Co., is due to return Monday after a trip to Europe.

### Welding Companies Merge

LYNN, MASS., Oct. 30—A consolidation of the Thomson Electric Welding Co. and the Gibb Welding Machine Co. of Bay City, Mich., has been announced. The new company will be known as the Thomson-Gibb Electric Welding Co. Both plants will continue in operation.

### Oakland Inventory Begun

DETROIT, Oct. 30—Final preparations have been completed for inventory by the Oakland Motor Car Co., Pontiac, and most of the plants will be closed at once, according to Gordon Lefebvre, vice-president in charge of operations.

### Allis-Chalmers Extends Rights Date

NEW YORK, Oct. 30—The Allis-Chalmers Mfg. Co., on account of the recent stock market situation which carried their stock to 41, has extended the expiration date of rights to subscribe to additional stock at 60 to Dec. 31.

## N.A.C.C. May Help Truck Operators

### Lower Distribution Costs Seen In Outcome of Session of Committee

NEW YORK, Oct. 29—Support for cooperative action by truck shippers in various states of the Union was voted by the Motor Truck Committee of the National Automobile Chamber of Commerce at its meeting today.

The committee, of which A. J. Brosseau is chairman, also indorsed the uniform bus code, which guarantees certain safety provisions for the passenger, such as minimum aisle space, seat room and step lights.

Decision to foster shippers' organizations in a number of states was arrived at on the basis that distribution costs can be materially lowered where there is cooperative effort.

In addition to Mr. Brosseau, the other members of the committee are: T. R. Dahl, D. C. Fenner, R. G. Haysen, W. F. McAfee, W. C. Parker, Martin L. Pulcher, Paul W. Seiler, H. E. Sneathen, and Edward F. Loomis, secretary. Guests present were: Robert P. Page, Jr., L. A. Graham, H. P. Doolittle and C. H. Magoffin.

## New Brake Regulations Are Issued in England

LONDON, Oct. 28 (Special)—The Ministry of Transport has issued regulations providing that a car fitted with four-wheel brakes need not comply with the existing regulation that two entirely independent braking systems must be fitted. There must, however, still be two independent means of operation; one such means must operate brakes acting upon all four wheels and the other may operate either on all four wheels or on two wheels only.

## Parts Show Recession

NEW YORK, Oct. 30—Manufacturers of parts, accessories and garage repair equipment who have enjoyed record business during the first eight months of the year, are now curtailing operations in a moderate way and will continue on slightly reduced schedules through November, according to the Motor and Equipment Association.

### Hahn Truck Executives Elected

ALLENTOWN, PA., Oct. 31—H. E. Zimmerman, formerly president of the Selden Truck Co., Rochester, N. Y., resigned Oct. 26 as vice-president of the Hahn Motor Truck Co., and Arthur J. Kooman has been elected president of Selden concern which became a subsidiary in a merger which took place on Jan. 1. William G. Hahn will continue as president, and Mr. Kooman has been elected first vice-president and general manager of the Hahn organization. L. K. Gordon, vice-president, is now in charge of production.



## Reaction of Steel Trails Wall Street

### Slow Orders Likely to Follow Stock Panic, Steel Men Believe

NEW YORK, Oct. 31—While Wall Street's spectacular housecleaning had no direct effect on steel prices, it served to alter somewhat the long range view of the market and its undertone.

Heretofore it had been thought that the present pause in representative buying would give way to marked expansion about the middle of December and that little difficulty would be encountered in obtaining full third-quarter prices.

Here and there this week one hears that there may be considerable hesitancy and procrastination in the placing of first quarter 1930 business and that buyers may bring more pressure to bear on prices than had been looked for earlier this month.

Hints have been dropped that production costs in the automotive industries will be watched even more closely than has been the case, and this is interpreted as indicative of stiff resistance on the part of consumers to price advances anywhere along the line.

A relatively fair volume of specifications against old sheet and strip-steel contracts continues to come out. Chevrolet and Ford buying furnishes the market's chief support in the way of fresh business, but generally speaking, demand is for small tonnages in hand-to-mouth fashion.

**Pig Iron**—Considering general conditions, Middle West sales of foundry and malleable iron are holding up fairly well.

**Aluminum**—Automotive demand is light. Prices are entirely unchanged.

**Copper**—Buyers are slow in taking hold for their November and December requirements.

### S.A.E. to Discuss Buses

NEW YORK, Oct. 28—Design, use, operation and maintenance of motor coaches and motor trucks will be considered from many angles at the 1929 transportation meeting of the S. A. E., which will be held at Toronto Nov. 12 to 15. Sessions will take place at the new Royal York hotel and those on Nov. 13 will be held jointly with the Motor Transport Division of the American Railway Association.

### Graham-Paige Makes Record

DETROIT, Oct. 30—This year's production by Graham-Paige reached and passed, on Oct. 15, the total for the entire year of 1928, during which 73,195 cars were built. Production in the remaining two and a half months of the year will thus represent a net gain over last year.

### Soviet Signs Large Tractor Order

OAKLAND, CAL., Oct. 31—Having purchased \$7,000,000 worth of tractors and harvesting machinery from

the Caterpillar Tractor Co. here, the "Zernotrest," Soviet Russian wheat trust, will take back to Russia 50 men to instruct Russians in operating the machinery. The purchase consisted of 1300 tractors and 750 combined harvesters, with which the "Zernotrest," one of the greatest producers of wheat in the world, will expand its operations and curtail its force of workmen in the wheat fields.

### Autolite Earnings Gain During First Nine Months

TOLEDO, Oct. 30—Earnings of \$9,614,511, equivalent to \$10.61 a share on the outstanding 885,998 shares of common stock of the Electric Autolite Co. for the first nine months of the year, were reported on Tuesday by C. O. Miniger, president. These earnings compare with \$7.23 a share on common in the first nine months of the previous year. This includes \$3.37 earned in the third quarter after preferred dividends and before Federal taxes, and does not include the proportionate share of \$4,000,000 received in a special non-recurring dividend earlier in the year, which brings the earnings up to \$13,614,511, before taxes.

"October sales will exceed those in September by about 15 per cent," declared President Miniger. "We are pleased to report that our company earned \$3.37 a share in the third quarter and I am satisfied that the fourth quarter earnings will be very satisfactory."

### Hecker is Curtis Head

CHICAGO, Oct. 31—Walter C. Hecker, former senior vice-president, has been elected president of Curtis Manufacturing Co., succeeding E. H. Steedman, resigned. Mr. Hecker joined the organization in 1905 as sales manager. He now heads the company's subsidiaries, including the Curtis Pneumatic Machinery Co., the Curtis Saw Co. and the Curtis Disc Clutch Co.

### Day-Elder Reduces Prices

IRVINGTON, N. J., Oct. 30—The National Motors Mfg. Co., makers of Day-Elder trucks, besides changing the frame, spring and tire sizes to increase the strength of carrying capacity, as announced recently in *Automotive Industries*, has reduced the price \$50 on the following models: GF, HF, HBF.

### Reynolds Spring Buys Premier

DETROIT, Oct. 30—Stockholders of the Reynolds Spring Co., Jackson, Mich., meeting at Wilmington, Del., last week, voted to purchase all issued and outstanding capital stock of the Premier Cushion Spring Co., Detroit.

### G.M. Truck is Concentrating

DETROIT, Oct. 28—Plans to remove the Yellow Sleeve-Valve Engine Works from East Moline, Ill., to Pontiac, as another step in the policy of uniting the entire production of the General Motors Truck Co. at Pontiac, have been announced by Paul W. Seiler, president of the latter company.

## Business in Brief

Written by the Guaranty Trust  
Co., New York, exclusively for  
AUTOMOTIVE INDUSTRIES.

NEW YORK, Oct. 31—Jobbing trade last week was fairly active, but retail trade was on a smaller scale. The levels of both wholesale and retail trade were below those a year ago, while general industrial activity continued above that a year ago. Building continued on a moderate scale, and sales of building materials fell off.

### CAR LOADINGS

Railway freight loadings for the week ended Oct. 12 amounted to 1,179,008 cars, which marks a decrease of 11,733 cars below those in the corresponding week last year and an increase of 59,001 above those in the corresponding week two years ago.

### FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Oct. 26 stood at 94.1, a new low for the year, as against 94.6 a week earlier and 94.7 two weeks earlier.

### STOCK MARKET

The stock market during the early part of last week showed signs of depression. On Thursday, Oct. 24, the market suffered what is generally considered the worst break in its history.

### FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Oct. 23 showed decreases of \$52,600,000 in holdings of discounted bills, of \$1,900,000 in holdings of Government securities, and of \$30,400,000 in member bank reserve deposits. Holdings of bills bought in the open market increased \$19,300,000. The reserve ratio on Oct. 23 was 74.5 per cent, as against 73.1 per cent a week earlier and 74.4 per cent two weeks earlier.

### De Soto Reaches 100,000

DETROIT, Oct. 30—Production this week of the 100,000th De Soto Six at the Highland Park plant of the De Soto Motor Corp., just 14 months after the first car was produced, was announced.

### Missouri Registrations Reported

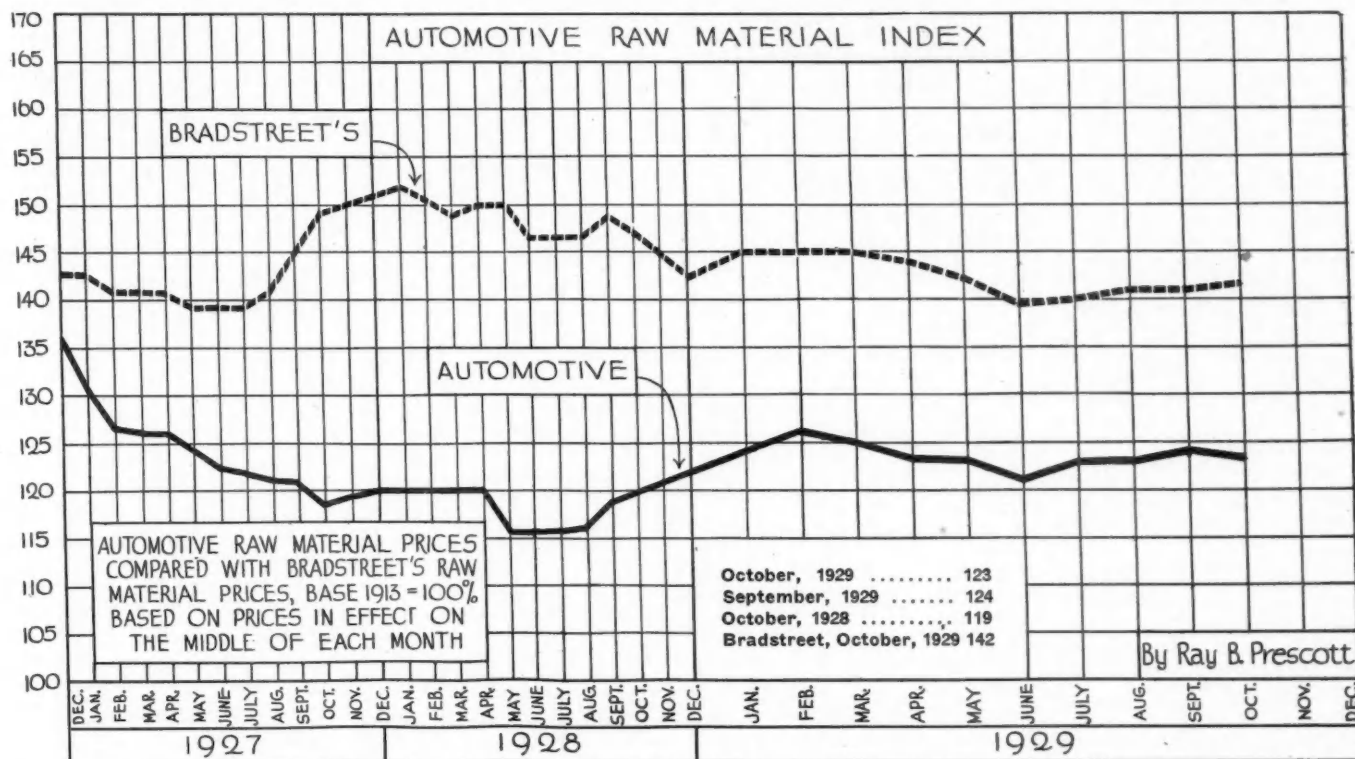
ST. LOUIS, Oct. 31—Records of the State License Commissioner show that 730,060 motor vehicles were licensed during the first nine months of 1929.

### Gardner Increases Scope

ST. LOUIS, Oct. 30—Russell E. Gardner, Jr., president of Gardner Motor Co., announced that two proposals, one to extend the powers and purposes of the corporation, the other to increase the common stock of the company from 300,000 shares of the par value of \$5 per share, to 500,000 shares, par value \$5 per share, were both ratified by a vote of the stockholders of the company.



## Raw Material Prices Decrease One Point



### Tax Overtures Are Made as Export Capital Gains

LONDON, Oct. 30—(Special cable)—The Prudential Assurance Co. has arranged to invest £1,000,000 with Rootes Bros., largest British car distributors and exporters, to foster export trade and organize service overseas. This new capital will lead to doubling British export, it is said. J. H. Thomas, minister for unemployment, this week conferred with representative British manufacturers and asked them to submit schemes whereby the motor industry could absorb more labor. It was believed that although the government preferred free trade, its main concern was to reduce unemployment, and it is generally assumed that this means the government will maintain import duties if manufacturers consider their removal harmful. The government will also drop the horsepower tax, imposing bigger fuel duty instead, if it is shown desirable, and will also assist cooperative merchandising overseas, it was reported.

#### Autocar Names Export House

ARDMORE, PA., Oct. 30—The Autocar Co. has appointed the American Near East Trading Co., Chicago, export distributors of Autocar trucks in Persia, Turkey, Arabia, Palestine, Iraq and Syria.

#### Oryx is Now Lea Fabrics, Inc.

NEWARK, N. J., Oct. 29—The Oryx Fabric Co., completing the first 18 months of operation as manufacturers of patented floor covering for automobiles, has changed its name to Lea

Fabrics, Inc., in honor of R. W. Lea, president and general manager. The product will be known as Lea Carpet. Additional manufacturing facilities will be added to increase the output for companies other than Cadillac, LaSalle and Packard, now absorbing the entire production.

### Bureau Changes Location

PARIS, Oct. 30 (Special)—Enlarging its scope largely as the result of action taken by the United States, the Bureau Permanent des Constructeurs, an international association grouping the world's automobile manufacturers, will move into bigger and independent offices in Paris, at the end of the year.

#### John Rohrer

WOODBIDGE, N. J., Oct. 27—John Rohrer, an automobile racing driver, was fatally injured here this afternoon in the sight of 8000 persons when a steering arm on his car broke in a race on the track of the Evans Speedway Association. He died on the way to the City Hospital at Perth Amboy. Rohrer was 25 years old and lived in McAdoo, Pa.

#### Durant Buys From Motor Wheel

DETROIT, Oct. 29—A contract has been closed by Durant Motors, Inc., to purchase all wire wheels used on Durant cars from the Motor Wheel Corp. of Lansing, it was disclosed by Jack Reese, purchasing agent of Durant, this week. This agreement calls for use of Motor Wheel wire wheels on cars made in the Lansing, Oakland, Cal., and Leaside, Ont., plants.

### Seeks to Standardize Fifth Wheel Connection

NEW YORK, Oct. 31—A committee of the Motor Truck division of the S.A.E. Standards committee has been appointed, with Charles S. Lyon of Motor Haulage Co., Inc., as chairman, to attempt the standardization of tractor fifth wheel connections. This equipment is of great importance in connection with the handling of freight at large terminals, and its non-standardization has been a cause of much inconvenience to contract haulers.

At a recent meeting of the Transportation committee and the Motor Truck division of the Standards committee of the S.A.E., at which this proposition was discussed, it was suggested that truck and trailer manufacturers develop a coupling design corresponding to the fifth wheel connections in use before the commercial introduction of the automatic and semi-automatic types, which should be called a standard.

#### Aero C. of C. Plans Los Angeles Meet

NEW YORK, Oct. 30—The Airports Section of the Aeronautical Chamber of Commerce of America, Inc., will hold an all-western regional airport conference at the Hotel Alexandria, Los Angeles, Nov. 7 to 9.

#### Ford to Be Honored

DETROIT, Oct. 31—Henry Ford is to be presented with the medal of the Pennsylvania Society of New York on Dec. 14 in New York, in recognition of his establishment of the Edison Institute of Technology, Charles M. Schwab, president, announced.

## Exports, Imports and Reimports of the Automotive Industry for September of Current Year, and Total for Nine Months Ending September, 1929

EXPORTS	Month of September				Nine Months Ending September			
	1928		1929		1928		1929	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories .....	..	\$32,719,769	..	\$33,401,143	..	\$372,980,476	..	\$455,382,705
Electric trucks and passenger cars .....	12	14,103	96	24,344	96	117,323	125	187,039
Motor trucks and buses, except electric (total) .....	8,065	5,785,704	12,985	7,409,732	95,991	64,891,477	162,451	91,480,878
Up to 1 ton, inclusive .....	5,617	2,715,263	10,056	4,378,474	71,982	36,433,360	124,953	54,228,946
Over 1, up to 2½ tons .....	2,246	2,553,816	2,710	2,498,205	21,655	22,678,985	34,863	30,430,797
Over 2½ tons .....	202	516,625	219	533,053	2,354	5,779,132	2,635	6,821,135
<b>PASSENGER CARS</b>								
Passenger cars, except electric (total) .....	22,494	16,744,809	20,934	14,394,282	287,748	203,221,570	291,752	199,115,314
Low price range up to \$1,000 .....	15,933	8,362,843	15,227	7,624,990	226,322	122,306,098	222,689	113,822,616
Medium price range, over \$1,000 to \$2,000 .....	5,694	6,366,559	4,971	5,150,687	52,971	60,070,104	60,906	65,808,074
High price range, over \$2,000 .....	867	2,015,407	736	1,618,605	8,455	20,845,368	8,157	19,484,624
<b>PARTS, ETC.</b>								
Parts, except engines and tires .....	..	5,402,614	..	5,992,980	..	47,623,459	..	93,612,664
Automobile unit assemblies .....	..	3,142,575	..	4,308,101	..	38,584,409	..	53,830,331
Automobile parts for replacement .....	..	711,173	..	645,845	..	7,030,795	..	7,696,571
Automobile accessories .....	..	444,415	..	508,443	..	5,369,552	..	5,788,299
Automobile service appliances .....	..	43,818	66	44,150	577	247,330	763	362,831
Trailers .....	96	171,566	30	388,307	134	1,479,502	270	4,353,436
Airplanes, seaplanes and other aircraft .....	17	136,104	..	151,227	..	1,015,227	..	1,626,515
Parts of airplanes, except engines and tires .....	..	..	..	..	..	..	..	..
<b>BICYCLES, ETC.</b>								
Bicycles .....	507	12,317	467	13,524	3,804	101,320	4,072	107,996
Motorcycles .....	979	231,370	1,447	320,671	14,677	3,415,432	13,532	3,049,858
Parts, except tires .....	..	90,098	..	93,729	..	1,108,269	..	868,305
<b>INTERNAL COMBUSTION ENGINES</b>								
Stationary and Portable .....	..	..	..	..	..	..	..	..
Diesel and Semi-Diesel .....	80	143,061	27	95,066	498	913,892	625	907,719
Other stationary and portable: .....	..	..	..	..	..	..	..	..
Not over 10 hp. ....	3,029	222,822	2,680	205,668	28,147	2,396,148	28,073	2,443,935
Over 10 hp. ....	716	231,440	406	207,296	3,982	1,547,223	3,616	1,801,854
Automobile engines for: .....	..	..	..	..	..	..	..	..
Motor trucks and buses .....	1,942	156,994	360	56,278	14,806	1,378,059	7,750	1,066,181
Passenger cars .....	6,488	761,788	5,375	569,581	97,481	10,133,384	80,842	8,394,727
Tractors .....	76	17,122	152	59,179	429	131,543	753	244,190
Accessories .....	..	981,351	..	1,064,616	..	7,048,170	..	9,433,879
<b>IMPORTS</b>								
Automobiles and chassis (dutiable) .....	42	75,765	92	78,842	372	779,847	525	913,455
Other vehicles and parts for them (dutiable) .....	..	30,529	..	97,964	..	462,030	..	1,550,405
<b>REIMPORTS</b>								
Automobiles (free from duty) .....	14	15,280	54	86,380	181	208,488	364	457,399

Autocar's Stockholders  
Approve New Share Plan

PHILADELPHIA, Oct. 30—Stockholders of the Autocar Co., Ardmore, Pa., at a special meeting held today, approved a plan to replace the present 100,000 shares of \$100 par value capital stock with 600,000 shares of no par value. Exchange of old stock for new will be on the basis of three shares of the new for one of the old.

Stockholders will be granted the right to subscribe for one additional share of the new stock for each three shares of the old stock now held, upon the payment of a \$30 premium. Shares of the new issue which will remain after the completion of the exchange have been underwritten by a banking syndicate, understood to include Janney & Co., Battles & Co. and Prince, Whitely & Co. No announcement was forthcoming as to whether public offering of such shares would be made.

## Pacific Zeppelin Co. Formed

NEW YORK, Oct. 29—At the organization meeting here today of the Pacific Zeppelin Transport Co., Commander J. C. Hunsaker, dirigible designer, was elected president. Paul W. Litchfield, president of the Goodyear Tire & Rubber Co. and the Goodyear Zeppelin Co., was elected chairman. The company proposes to build dirigibles for service between the Pacific Coast and Honolulu.

## Hupp Earnings Down

DETROIT, Oct. 30—Hupp Motor Car Corp. reported a net income of \$3,237,441 for nine months ended Sept. 30, after depreciation and Federal taxes. This is equal to \$2.25 a share on 1,440,-

319 shares of \$10 par stock and compares with net profit of \$6,694,551, or \$6.34 a share, on 1,056,077 shares in the first nine months last year.

## Reo Earnings Are Off

LANSING, MICH., Oct. 29—Reo Motor Car Co. reports net profit for the nine months ended Sept. 30, after all charges, of \$2,093,655. This is equivalent to \$1.04 a share on common stock and compares with \$4,561,656, or \$2.28 a share, for the first nine months of last year.

## Hexcel Sells to Sears, Roebuck

MILWAUKEE, Oct. 29—The Hexcel Radiator Co. has been awarded a five-year contract with Sears, Roebuck & Co. for the mail order concern's entire national requirements of Ford type replacements, involving several million dollars' worth of radiators.

Huge Seaplane Planned  
for Atlantic Passage

WASHINGTON, Oct. 28—A giant flying boat to accommodate 170 passengers and crew for trans-Atlantic service has been designed by Dr. Ing E. Rumpler of Berlin, famous as the constructor of the Rumpler Taube fighting plane during the World War, according to the Department of Commerce.

The designs, which have been approved by the German aeronautical testing institute, follow closely the principle of the "flying wing," from which twin boats are suspended.

## DeLargey is Promoted

DETROIT, Oct. 30—F. L. DeLargey, formerly purchasing agent for the Wilcox products division of the Wilcox-Rich Corp., has been appointed supervisor of purchases of all divisions.

## Financial Notes

Company	Announces	Amount	Remarks
Allis-Chalmers .....	net profit 9 mos.	\$3,379,340.00	\$11.92 per share
American Forging & Socket div.	..	..	On common
Borg-Warner .....	net profit 9 mos.	6,401,358.00	\$5.05 per share
Budd Wheel Co. ....	net profit 9 mos.	1,601,626.00	\$7.10 per share
C. M. Hall Lamp Co. ....	net profit 9 mos.	1,036,000.00	\$2.59 per share
Eisemann Magneto .....	reg. quar. div.	1.75	Nov. 1 record Oct. 21
Electric Auto-Lite .....	9 mos. net earnings	9,614,511.00	..
Hercules Motors Corp. ....	net profit 8 mos.	856,273.00	\$2.74 per share
Limousine Body Corp. ....	9 mos. profits	202,257.00	1928 period \$29,938
Mullins Mfg. Corp. ....	9 mos. net profit	474,748.00	\$3.17 per share
Perfect Circle Co. ....	9 mos. net profit	761,084.00	\$4.68 per share
Spicer Mfg. Co. ....	9 mos. profit bef. tax	2,356,018.00	..
Stewart-Warner .....	net profit 9 mos.	6,426,278.00	\$5.15 per share
Stewart-Warner .....	reg. quar. div.	..	..
Triplex Safety Glass (Eng.)	Net profit yr. June 30	£2657	..
Union Carbide .....	net profit 9 mos.	9,522,421.00	..
White Motor Co. ....	reg. quar. div.	.50	Dec. 31 record Dec. 12
Wilcox-Rich Corp. ....	reg. quar. div.	.62½	Class A and B
Wright Aeronautical .....	reg. quar. div.	.50	Nov. 30 record Nov. 15
Yellow Truck & Coach .....	net profit 9 mos.	853,068.00	Incl. Yellow Acc.



## Building Slumps As Production Recedes

Construction Expected to Pick  
Up When Factories Open  
for New Car Models

PHILADELPHIA, Oct. 31—Plant construction in the automotive industry announced this week, indicates a recession sympathetic to that of construction generally.

It is expected, however, that before heavy production picks up following the general curtailment now in evidence among automobile manufacturers, that parts makers and car manufacturers will announce considerable building.

Among automotive plans for construction are:

Ford Motor Co. asked bids for assembling plant at Edgewater, N. J., to cost \$1,000,000. (Albert Kahn, Inc., Detroit, architect.)

United States Rubber Co., New York, asked bids for proposed Paterson, N. J., plant, to cost \$800,000. (Lockwood Greene Engineers, Inc., architects.)

Stoneleigh Stores Corp., Baltimore, will soon ask bids for repair and service garage to cost \$1,500,000 with equipment. (Wyatt & Nolting, architects.)

Pitcairn Aviation, Inc., Philadelphia, awarded contract to Birmingham Construction Co., Birmingham, for repair shop and hangar for Atlanta airport, to cost \$65,000. (John K. Ottley, Jr., Atlanta, architect.)

Keystone Aircraft Corp., Bristol, Pa. (unit of Curtiss-Wright Corp.), contemplating manufacturing expansion to cost \$250,000.

Brewer-Titchener Corp., Cortland, N. Y., awarded contract to Austin Co., Cleveland, for \$125,000 automobile accessory and parts manufacturing additions.

U. S. Pressed Steel Co., Ypsilanti, Mich., plans addition for manufacture of new universal driveshafts; plant to cost \$75,000 with equipment.

Ex-Cell-O Aircraft & Tool Corp., Detroit, has increased capital for expansion of facilities to manufacture aircraft engines.

Motor Wheel Corp., Lansing, contemplates expenditure of additional \$120,000 to present \$200,000 project.

Panyard Piston Co., Muskegon, incorporated to manufacture piston rings, has purchased Panyard Machine & Mfg. Co. and contemplates expansion.

Allis-Chalmers Mfg. Co., West Allis, Wis., plans addition to tractor plant at Springfield, Ill., to cost \$400,000 with equipment. West Allis plant to be improved with \$1,500,000 construction program.

Snap-On Wrench Co., Milwaukee, move to Kenosha and install \$200,000 worth of new manufacturing equipment.

### Plymouth Sedan Sales Gain

DETROIT, Oct. 31—Factory orders for the new Plymouth de luxe sedan, announced a week ago, are 33 1/3 per cent in excess of scheduled production.

### AC to Show New Lines

FLINT, MICH., Oct. 31—New long life spark plugs, marine products consisting of instrument board panels, tachometers, outboard tachometer assembly and marine spark plugs will be exhibited by the AC Spark Plug Co. at the M. & E. A. show in Chicago.

## Soviets Building Industrial Center

MOSCOW, Oct. 31—Details have been published on plans for a huge \$300,000,000 industrial center to be built by the Soviet Government on the banks of the Dnieper River adjoining a \$100,000,000 hydro-electric plant, the erection of which is now being supervised by Hugh L. Cooper, American waterpower engineer.

## Germans Acclaim Airplane With Unusual Controls

BERLIN, Oct. 26 (Special)—What German aviation circles enthusiastically lauded as the airplane of the future was demonstrated at Tempelhof Field today before a noted array of aviation experts. The Stork, as the tailless airplane is called, has the shape of an arrow, with very short fuselage for the pilot's seat, an eight-horsepower motor and a pusher propeller, and is the nearest approach to a "nothing-but-wing plane."

All the controls are arranged on the wings, being operated separately on either side, which simultaneously simplifies the construction and the piloting. The absence of a tail and chariot, in addition to the pushing capacity of the propeller, affords aero-dynamic advantages which are expressed in the astoundingly high speed of 125 kilometers (78 miles) an hour with one eight-horsepower motor only.

## Miss Chrysler to Marry

NEW YORK, Oct. 28—Mr. and Mrs. Walter Percy Chrysler have announced the engagement of their daughter, Miss Bernice Chrysler, to Edgar William Garbisch, son of Dr. and Mrs. Henry Christian Garbisch of Washington, Pa. Miss Chrysler was graduated from Ely Court, Greenwich, completing her studies in art and languages in Paris. She was introduced to society in New York during the season of 1926-27.

### Approves New Air Engine

WASHINGTON, Oct. 28—A seven-cylinder radial engine developing 140 hp. at 1800 r.p.m. has been granted approved type certificate No. 31 by the Dept. of Commerce. The engine was submitted by the Air Craft Engine Corp., Philadelphia, and is the company's type LA 1.

### Automobile Merchants Play Off

NEW YORK, Oct. 30—Automobile Merchants Association of New York, Inc., held the closing golf tournament for the season recently at the Winged Foot Golf Club, Mamaroneck, N. Y. M. R. Brown, of the Fiske Tire Co., won the president's cup, donated by C. H. Larson.

## Depreciation Study Will be Undertaken

Chamber of Commerce and  
Treasury Department  
Sponsoring Research

WASHINGTON, Oct. 30—Depreciation on machinery and equipment, of vital interest to manufacturers of automotive products, equipment and accessories, will be among subjects to be discussed at the fourth conference of machinery and equipment associations to be held at the Chamber of Commerce of the United States on Nov. 11. Discounts on motor equipment also will be discussed.

Trade associations, at the suggestion of the Treasury Department, undertook the study of rates of depreciation of machinery and equipment, and the department recently announced that it would discontinue such studies and would issue within a few months a publication containing rates of depreciation.

The Bureau of Internal Revenue hopes to have the publication available by Jan. 1, though it may not be ready until a later date. The publication will cover rates of depreciation in all industries and will be the first of the kind ever prepared.

## Graham-Paige Wins Rally

DETROIT, Oct. 30—Graham-Paige, winner of the Automobile Club of Paris challenge trophy in the recent Tour de France, and victor in this year's international Monte Carlo tour, has won the Deauville-LaBaule rally. In competition with the leading makes of foreign cars, Graham-Paige entries finished in first, third, fourth and seventh positions, having put up a remarkable exhibition of consistent running throughout the run.

### Cummins Ship Diesel Unit

COLUMBUS, IND., Oct. 31—A Diesel engine for an oil-electric locomotive has been completed by the Cummins Engine Co., which has been building such oil engines for power shovels, marine and stationary work for some years. The locomotive engine is a six-cylinder one of 10-in. bore and 12-in. stroke, and it weighs 14,000 lb.

### Plan Small Automobile

CHICAGO, Oct. 31—The Thompson Motor Car Co. has been established and organized at Muscatine, Iowa, to manufacture and sell a small automobile at \$350. The experimental cars have a 75-in. wheelbase, are powered with Continental four-cylinder engines, standard gearset and have coupe bodies.

### Opens Western Office

LOS ANGELES, Oct. 30—The Pratt & Whitney Aircraft Co. of Hartford, Conn., has opened a Pacific Coast office here, in charge of E. B. Haines, who will have charge of sales and service.



# Men of the Industry and What They Are Doing



Bert Dingley has been appointed general factory manager of Stutz Motor Car Co. in addition to his present duties as vice-president.

## Freitag Joins Sterling

Roland C. Freitag, since 1925 general advertising manager of the Kissel Motor Car Co., Hartford, Wis., has resigned in order to accept the position of advertising manager of the Sterling Motor Truck Co., Milwaukee. Before going to Kissel, Mr. Freitag was in charge of sales and advertising for a large Racine, Wis., industrial concern, later taking charge of advertising for the Everwear Hosiery Co., Milwaukee.

## Chadbourne With Outboard

Dean Chadbourne has been elected vice-president of the Outboard Motors Corp., Milwaukee, in charge of sales and advertising. The company is a recent consolidation of the Evinrude Motor Co. and Elto Outboard Engine Co., Milwaukee, and the Lockwood Motors Co., Jackson, Mich.

## Seaman Sails

Harold H. Seaman, president of the Seaman Body Corp., Milwaukee, has sailed for Europe to attend the Paris automobile show. He is accompanied by Earl C. Gunn and Mead F. Moore, designing engineers of the Racine and Milwaukee plants of the Nash Motors Co., respectively. A study of European trends in passenger car design will be made.

## Named District Sales Manager

Roy Erb, formerly with the Hudson Motor Car Co. as district sales manager and prior to that with the Nebraska-Buick Co., has been appointed in charge of wholesale sales in this territory for the Sioux Hudson-Essex Co., Sioux City, Iowa, distributor for Hudson and Essex cars. Ted Zenz has been appointed superintendent of the Hudson-Essex service department.

## Names Regional Chiefs

The Graham - Paige International Corp. has announced the appointment as regional directors of E. P. Curtiss, for Java, Siam, India, Ceylon, Dutch East Indies and Straits Settlements, and J. H. Wise in South America.

## Outlines Production Plan

George M. Graham, vice-president of Willys-Overland Co., outlined synchronized production and sales policies to some 300 Michigan dealers and salesmen at a meeting. As a result of the factory's new policy, recently announced by L. A. Miller, president, dealer stocks are extremely low and used car stocks are being liquidated in excellent shape.

## Heads Australian Agency

Sir Mark Sheldon, K. B. E., has been elected chairman of the board of Campbell-Ewald (Australia), Ltd., organized by Campbell-Ewald Co., Detroit advertising agency. He is a director of several very successful financial and commercial institutions, including the Bank of Commerce of Australia. He was president of the Associated Chamber of Commerce there, 1922-23; representative of Australia at the League of Nations Assembly in 1922, and at the London Economic Conference in 1925. He has also acted as Australian commissioner at Washington.

## Fenner in South America

Herbert E. Fenner, general service manager of the American Bosch Magneto Corp., is making an extended tour of the principal cities and smaller centers in the countries of South America.

## Ray Mullen With Marmon

Ray H. Mullen has been appointed district representative in the states of Georgia, Florida and eastern Tennessee, for the Marmon Motor Car Co.

## Brown Joins Milwaukee Tank

Cleon D. Brown has been appointed sales and advertising manager of the Milwaukee Tank Works, 1615 Fratney St., Milwaukee, manufacturing pumps, air compressors, tanks and other filling station equipment.

## Martin Chooses Ungar

Gustav A. Ungar has been appointed production engineer of the newly organized Martin Motor Truck Corp. He was educated in Europe and spent some time as automotive engineer in German and Austrian automobile plants.

## Nelson Appointed by G.E.

George E. Nelson has been appointed general manager of the Northern division of the National Lamp Works of General Electric Co., succeeding O. F. Stuefer.

## Rochelle Appointed

R. C. Rochelle has been chosen to take charge of the Western division of the Marmon factory sales department, according to Thomas E. Jarrard, general sales director of the Marmon Motor Car Co.



H. F. Byrne, who has been appointed service manager of Hudson Motor Car Co., will direct the world-wide Hudson - Essex service organization.

## Physicians Honor Ford

Henry Ford was made an honorary member of the Interstate Post-graduate Medical Association of North America, during the convention of the association in Detroit last week. Mr. Ford attended the ceremony in person, which was held at the Masonic Temple. Thomas A. Edison was presented with a medal appreciative of his contributions to medical science during a visit of officials of the association at the Ford residence at Dearborn.

## Work Returns From Coast

James Work, vice-president of the Detroit Aircraft Corp., who has just returned from an inspection trip to the West Coast division, reports that the production schedule of 12 Lockheed planes per month is being maintained at the Burbank plant, despite the fact that the number of employees has been materially reduced since the reorganization of the plant by the Detroit Aircraft Corp.

## Webb Sails for Europe

Jervis B. Webb, president of the Jervis B. Webb Co., factory conveyor engineers, of Detroit, left recently for a business trip to England, France and Germany. He has planned to return to this country in the latter part of November.

## Reports Optimism

Harry J. Shorter, assistant general sales manager of Durant Motors, Inc., returning to Detroit from a two weeks' trip through 13 states in the Mississippi Valley, reports that Durant automobile distributors and bankers, many of whom he met on his trip, view the future with optimism. He visited Minneapolis, St. Paul, Kansas City, Wichita, Oklahoma City, Tulsa and Dallas.

## Hughes Joins Copeland

Edward Hughes, formerly general manager of the Heywood Starter Corp. and prominent aviation construction engineer, has been appointed works manager of Copeland Products, Inc.

## Roadbuilders and Aero Chamber Join In Discussing Airport Construction Plans

WASHINGTON, Oct. 30—With an attendance of 300, the first Municipal Airport Conference, held here on Thursday and Friday of last week under the auspices of the City Officials division of the American Road Builders' Association and the Aeronautical Chamber of Commerce of America, developed a wealth of important data concerning problems relating to the construction and operation of municipal airports. The material will be used for the preparation of a report to be presented at the annual meeting of the City Officials division to be held during the annual convention and exposition of the American Road Builders' Association at Atlantic City, Jan. 11-18.

The conference adopted specific recommendations that the states should pass legislation for uniform codes and practices, covering licensing of pilots, taking off, policing of fields, etc., as recommended by the Department of Commerce.

A great deal of emphasis was laid on the necessity of not permitting aviation to be placed under the control of the Interstate Commerce Commis-

sion, one of the main points made being that at the present stage of development of aviation all investments in the industry are of a pioneer character and experimental. It was declared that progress of aviation would be hampered if it were classed as a fully going industry such as the railroads.

Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, said that three phases of European airports are fundamentally applicable to airport management and administration in the United States; (1) adequate jurisdiction with a qualified executive in charge; (2) definite control of all activities, including their segregation when possible and advisable, and (3) uniform rules and regulations governing the operation of aircraft in the vicinity of the airport and in landing and taking off. He expressed the conviction that the problems of airport management can be successfully handled without difficulty if a competent executive with suitable authority exercises intelligent control over all activities in conformity with uniform requirements.

## London Buses are Ordered to Use Pneumatic Tires

LONDON, Oct. 30 (Special)—The licensing authorities of the metropolitan area have issued an order stating that after Dec. 31 no new motor bus with solid tires will be licensed for operation in London. The object is to secure greater quietude. A 20 per cent tax rebate is allowed on the standard prevailing previously irrespective of tire equipment.

At present the London General Omnibus Co., which controls 95 per cent or more of London's buses, has only 200 of a fleet of 4500 fitted with pneumatics. Although these existing vehicles will not come under the new order, the company is fitting pneumatics to every bus as it goes in for its periodical overhaul.

## Ambi-Budd Owns None of N.S.U.

PHILADELPHIA, Oct. 28—A recently published statement that Ambi-Budd Pressewerke, in conjunction with Schroder of London, owned a quarter of the stock of N. S. U., German automobile manufacturer, was denied by officials of the E. G. Budd Mfg. Co., American affiliate of Ambi-Budd, in a statement issued here today. Referring to the above statement, it was said: "Please be advised that this is not in accordance with the facts, as the Ambi-Budd Co. does not own any of the N. S. U. stock at all."

## To Reorganize Oshkosh Truck

OSHKOSH, Wis., Oct. 30—A committee representing bondholders of the Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis., has bid in the property at

sheriff's sale. The concern will be reorganized, refinanced, and continue manufacturing on a larger scale than heretofore, it is stated.

## Gramm, Inc., Organized

TOLEDO, Oct. 29—Gramm, Inc., a new corporation organized under Ohio laws with capital of 40,000 shares of no par common stock, has been incorporated to hold the common stock of Gramm Motors, Inc., and the Gramm Finance Co., and provide at least \$330,000 of new capital for the expansion of both the manufacturing facilities at Delphos and the distributing center at Toledo.

## Auburn to Increase Plant Capacity

AUBURN, IND., Oct. 30—Enlargement of the Auburn-Connersville plants to a production capacity of 300 cars daily is now under way and will be completed by the first of the year, R. H. Faulkner, vice-president, announced. The enlargement will involve additional buildings, cranes, presses, dies, assembly lines and other machinery.

## Limousine Body Has Record October

KALAMAZOO, MICH., Oct. 30—With an increased production of 109.2 per cent in October of this year over October, 1928, the Limousine Body Co., an Auburn subsidiary, is experiencing the greatest year in its history. Production for the first nine months of the year, J. D. Bobb, president, announced, was 56.3 per cent greater than that of the first nine months of last year. October production will be in excess of 1000 bodies.

## S.A.E. Joins Aero C. of C. in Session

### Diesel Discussion on Agenda for November Meeting in Los Angeles

NEW YORK, Oct. 28—The Society of Automotive Engineers in conjunction with the Aeronautical Chamber of Commerce will hold meetings in Los Angeles Nov. 11, 12 and 13, as guests of the Southern California Section of the S.A.E., to discuss the possibilities of Diesel type engines as aeronautical powerplants.

Among the questions to be discussed at these meetings will be: Will the Diesel engine displace the present aeronautical powerplant? Can heavy oil be successfully used as fuel for airplanes? and What must be done to secure greater speed and safety in air travel? The program for these meetings, which will be held in the evening in the ballroom of the Alexandria Hotel, follows:

#### Tuesday, Nov. 12

3.15 P. M.—Dinner—Southern California Section, Society of Automotive Engineers—Ballroom, Hotel Alexandria

7.30 P. M.—Aircraft—Engine Session  
Harry A. Miller, Chairman  
President, Harry A. Miller, Inc.  
Maintenance and Operating. Inspection of Airplane Engines  
George Cain, Transcontinental Air Transport  
Diesel Aircraft Engines  
Leigh M. Griffith, Vice-President, Emsco Aero Engine Co.  
Trend in Aircraft Engine Design  
Commander E. E. Wilson, U. S. N.

#### Wednesday, Nov. 13

7.30 P. M.—Air Transportation and Engineering Session  
Commander E. E. Wilson, Chairman, Chief of Staff to Commander Aircraft Squadrons Battle Fleet, U. S. N.  
The Wind Tunnel as an Engineering Instrument  
Dr. A. L. Klein, Assistant Professor of Aeronautics, California Institute of Technology  
High-Speed Transport Planes  
Gerard Vultee, Chief Engineer, Lockheed Aircraft Co.  
Long-Distance Passenger Transportation  
Harris M. Hansue, President, Western Air Express

## Screw Machine Groups Merge

BUFFALO, N. Y., Oct. 28—At a special meeting of the Screw Machine Products Association held in Chicago on Oct. 17, formal action was taken to merge with the Screw Machine Products Institute. About a year ago, a survey of the screw machine products industry was made by Dr. Arthur E. Swanson. Upon his recommendation the Screw Machine Products Institute was set up among members of the association to work out certain policies and plans centering largely around cost studies.

## Establishes European Headquarters

DETROIT, Oct. 28—Graham-Paige International Corp., which handles the Graham-Paige export business, has announced the establishing of European headquarters at Antwerp, Belgium.



## General Motors Earnings Drop for Month, Quarter

NEW YORK, Oct. 28—General Motors Corp. reports net earnings for the nine months ended Sept. 30, including equities in undivided profits of subsidiary and affiliated companies, of \$222,848,335. This is equivalent after preferred dividends to \$4.96 a share on common stock and compares with \$240,534,613, or \$5.37 a share, for the first nine months of 1928.

Third quarter earnings totaled \$70,988,025 as compared with \$79,266,639 for the third quarter a year ago. This is equivalent after preferred dividends to \$1.55 a share on the common stock as compared with \$1.77 a share for the corresponding quarter of 1928.

## Parisians Buy Cords

AUBURN, IND., Oct. 28—An initial order for 100 Cord front-drive cars from Jomini & Martet, Paris distributor for Auburn and Cord cars, has been received here. In a cable to the company, Messrs. Jomini & Martet announced that 18 Cord cars were sold the first three days that the car was on display at their showrooms, and that sales at the Paris Salon would reach a total far in excess of expectations.

## Chain Belt Opens 18th Branch

MILWAUKEE, Oct. 29—The Chain Belt Co. has opened a New England district office in Boston. This makes the eighteenth district office the company has opened. J. K. Merwin, district manager, worked at the Chain Belt Co.'s Milwaukee plant and west Milwaukee plant.

## Kohr Joins Bendix

SOUTH BEND, IND., Oct. 31—Robert F. Kohr, for the last three years in charge of brake experimental work for Studebaker, has joined the engineering staff of the Bendix Brake Co.

## South Bend's Forte Entirely Omitted

NEW YORK, Oct. 28—The Encyclopaedia Britannica, Inc., has begun an inquiry to ascertain why the new 14th edition of the encyclopedia set forth under the caption, "South Bend (Ind.)" that the chief industry of that city was still the manufacture of "wagons and carriages" by Studebaker Brothers, and neglected to mention its greater industry, the manufacture of motor cars.

## Will Discuss Exports

CHICAGO, Oct. 28—Export markets as an outlet for American goods, and particularly of automotive products, will occupy an important place on the program of the Motor & Equipment Association Convention at the Stevens Hotel in Chicago during the week of Nov. 4 to 9. Heading the list of speakers will be R. J. Archer, vice-president and general manager of the John N. Willys Export Corp.

## L. C. Lemon

MUSCATINE, IOWA, Oct. 28—L. C. Lemon, 42, president and general manager of the Muscatine Coach Line since its organization last March as successor to the electric street car system, died suddenly Oct. 14 in his home here. Acute indigestion followed by heart attack caused his death.

## Dodge Boats to Use Lycoming Engines

WILLIAMSPORT, PA., Oct. 30—The entire 1930 lines of Dodge water cars will be powered by Lycoming engines, it was learned here today. The initial order calls for 3000 engines.

## Proper Material is Need for Convertible Models

DETROIT, Oct. 28—"The major drawback to the more widespread introduction of convertible models is the unavailability of proper top materials," L. Clayton Hill, vice-president, Dietrich, Incorporated, stated at a meeting recently of the Body Division, Detroit Section, S.A.E.

"What is mainly needed," Mr. Hill stated, "is a top material that will not shrink to an appreciable extent and that will be impregnated with a waterproofing material which will also prevent the lodging of dirt particles in the weave."

To a representative of Automotive Industries Mr. Anderson expressed the opinion that this condition is now rapidly changing but that much can still be done.

## Canadian Durant Gains

DETROIT, Oct. 30—Shipments of cars from the plant of Durant Motors of Canada, Ltd., at Toronto, Ont., during the first nine months of 1929, totaling 18,646 units, have gained 21 per cent over the entire 1928 output of 15,501 units, according to company officials. The Toronto plant supplies cars for consumption in Canada, Australia, New Zealand, and South America.

## USL Opens Canadian Factory

NIAGARA FALLS, N. Y., Oct. 28—The USL Battery Corp. has opened a new factory in Toronto, which is said to be the largest and most modern battery plant in Canada. Other plants of the company are at Oakland, Cal., and Sydney, Australia.

## C.I.T. to Finance Auburn Sales

NEW YORK, Oct. 31—A contract for financing foreign sales of Auburn and Cord cars has been signed with the Auburn Automobile Co. by Commercial Investment Trust, Inc.

# Calendar of Coming Events

## SHOWS

M.&E.A. Show and Convention, Chicago ..... Nov. 4-9  
Charleston, S. C., Automobile ..... Nov. 11-18  
New York Automobile Salon ..... Dec. 1-7  
National Power Show, Grand Central Palace, New York ..... Dec. 2-7  
Philadelphia, Automobile ..... Jan. 11-18  
Buffalo, Automobile ..... Jan. 11-18  
Milwaukee Automobile Show ..... Jan. 11-18  
Cincinnati, Automobile ..... Jan. 12-18  
Boston, Automobile ..... Jan. 18-25  
Detroit, Automobile ..... Jan. 18-25  
Baltimore, Automobile ..... Jan. 18-25  
Harrisburg, Automobile ..... Jan. 18-25  
Louisville, Automobile ..... Jan. 18-25  
Hartford, Automobile ..... Jan. 18-25  
Pittsburgh, Pa., Automobile ..... Jan. 18-25  
Rochester, Automobile ..... Jan. 20-25  
Columbus, Automobile ..... Jan. 26-Feb. 1  
Wilkes-Barre, Automobile ..... Jan. 27-Feb. 1  
San Francisco, Cal., Automobile ..... Feb. 1-8  
Toledo, Ohio, Automobile ..... Feb. 3-8  
Wichita, Automobile ..... Feb. 3-8  
Cumberland, Automobile ..... Feb. 3-8  
Syracuse, Automobile ..... Feb. 3-8  
Peoria, Automobile ..... Feb. 4-8  
St. Louis, Automobile ..... Feb. 4-9  
Denver, Automobile ..... Feb. 10-15  
Sheboygan, Wis., Automobile ..... Feb. 10-16  
Providence, Automobile ..... Feb. 14-22  
Camden, N. J., Automobile ..... Feb. 24-Mar. 1  
Des Moines, Automobile ..... Feb. 24-Mar. 1  
Seattle, Wash., Automobile ..... Feb. 25-Mar. 2  
Detroit (All-American Aircraft) ..... April 5-13

N.S.P.A. Show and Convention, Detroit ..... Nov. 11-16  
London, Trucks ..... Nov. 7-16  
Paris, Trucks ..... Nov. 14-24  
London, Motorcycles ..... Nov. 30-Dec. 7  
Brussels Auto Salon ..... Dec. 7  
New York National ..... Jan. 4-11  
Newark (N. J.) Automobile Show ..... Jan. 11-18  
Boston Automobile Show ..... Jan. 13-25  
Chicago National, Colliseum ..... Jan. 25-Feb. 1  
Cleveland Automobile Show ..... Jan. 25-Feb. 1

## CONVENTIONS

Asbestos Brake Lining Assn., New York ..... Dec. 11  
Ohio Assn. of Commercial Haulers, Cleveland ..... Jan. 30-31  
World Engineering Congress, Tokio, Japan ..... Oct. 29-Nov. 22  
Overseas Club Dinner, Chicago ..... Nov. 6  
National Automotive Parts Association, Detroit ..... Nov. 6-8  
National Tire Dealers Assn., Chicago ..... Nov. 11-14  
International Acetylene Assn., Chicago ..... Nov. 13-15  
National Asso. Finance Companies, Chicago ..... Nov. 19-20  
American Society Mechanical Engineers, New York ..... Dec. 2-6

Highway Research Board, Ninth Annual Meeting, Washington, D. C. ..... Dec. 12-13  
National Automobile Dealers Association, New York City ..... Jan. 6  
American Roadbuilders Association, Atlantic City ..... Jan. 11-18  
American Institute Electrical Engineers, New York ..... Jan. 27-31  
National Automotive Dealers Association, Chicago ..... Jan. 27-28  
Southwest Road Show and School, Wichita ..... Feb. 25-28  
American Society Mechanical Engineers, Fiftieth Anniversary Celebration: New York ..... April 5  
Hoboken, N. J. ..... April 7  
Washington, D. C. ..... April 8-9

## RACES

Los Angeles ..... Nov. 17

## S. A. E.

Transportation Meeting, Toronto ..... Nov. 12-15  
Annual Meeting, Detroit ..... Jan. 21-24

## SALONS

Hotel Drake, Chicago ..... Nov. 9-16  
Hotel Commodore, New York City ..... Dec. 1-7  
Hotel Biltmore, Los Angeles ..... Feb. 8-15  
Palace Hotel, San Francisco, Feb. 22-Mar. 1